

**Fishery Management Report for Sport Fisheries in the  
Arctic-Yukon-Kuskokwim, Tanana River, and  
Northwest Alaska Regulatory Areas, 1992**

by

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Alaska Department of Fish and Game

Division of Sport Fish



## Symbols and Abbreviations

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Weights and measures (metric)		General		Mathematics, statistics, fisheries	
centimeter	cm	All commonly accepted abbreviations.	e.g., Mr., Mrs., a.m., p.m., etc.	alternate hypothesis	$H_A$
deciliter	dL	All commonly accepted professional titles.	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
gram	g	and	&	catch per unit effort	CPUE
hectare	ha	at	@	coefficient of variation	CV
kilogram	kg	Compass directions:		common test statistics	F, t, $\chi^2$ , etc.
kilometer	km			confidence interval	C.I.
liter	L			correlation coefficient	R (multiple)
meter	m	east	E	correlation coefficient	r (simple)
metric ton	mt	north	N	covariance	cov
milliliter	ml	south	S	degree (angular or temperature)	°
millimeter	mm	west	W	degrees of freedom	df
<b>Weights and measures (English)</b>		Copyright	©	divided by	÷ or / (in equations)
cubic feet per second	ft <sup>3</sup> /s	Corporate suffixes:		equals	=
foot	ft	Company	Co.	expected value	E
gallon	gal	Corporation	Corp.	fork length	FL
inch	in	Incorporated	Inc.	greater than	>
mile	mi	Limited	Ltd.	greater than or equal to	≥
ounce	oz	et alii (and other people)	et al.	harvest per unit effort	HPUE
pound	lb	et cetera (and so forth)	etc.	less than	<
quart	qt	exempli gratia (for example)	e.g.,	less than or equal to	≤
yard	yd	id est (that is)	i.e.,	logarithm (natural)	ln
Spell out acre and ton.		latitude or longitude	lat. or long.	logarithm (base 10)	log
<b>Time and temperature</b>		monetary symbols (U.S.)	\$, ¢	logarithm (specify base)	log <sub>2</sub> , etc.
day	d	months (tables and figures): first three letters	Jan., ..., Dec	mideye-to-fork	MEF
degrees Celsius	°C	number (before a number)	# (e.g., #10)	minute (angular)	'
degrees Fahrenheit	°F	pounds (after a number)	# (e.g., 10#)	multiplied by	x
hour (spell out for 24-hour clock)	h	registered trademark	®	not significant	NS
minute	min	trademark	™	null hypothesis	$H_0$
second	s	United States (adjective)	U.S.	percent	%
Spell out year, month, and week.		United States of America (noun)	USA	probability	P
<b>Physics and chemistry</b>		U.S. state and District of Columbia abbreviations	use two-letter abbreviations (e.g., AK, DC)	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
all atomic symbols				probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
alternating current	AC			second (angular)	"
ampere	A			standard deviation	SD
calorie	cal			standard error	SE
direct current	DC			standard length	SL
hertz	Hz			total length	TL
horsepower	hp			variance	Var
hydrogen ion activity	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

***FISHERY MANAGEMENT REPORT NO. 95-9***

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ARCTIC-YUKON-KUSKOKWIM, TANANA RIVER, AND NORTHWEST  
ALASKA REGULATORY AREAS**

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## **PREFACE**

This report is organized into two major sections. Section I provides an overview of the Arctic Yukon Kuskokwim Region and its constituent regulatory management areas; the Tanana River Area, the Arctic Yukon Kuskokwim Area, and the Northwest Alaska Area. Included is a description of the geography of the areas and how management activities are organized; a description of the Alaska Board of Fisheries Process and schedule for the management areas; an inventory of fisheries resources available in the areas; an historical perspective of sport angler effort and harvest within waters of the management areas; estimates of economic values of sport fisheries within the management areas; a description of stocking, research, management, and access program activities conducted within the management areas; and a summary of major social and biological fisheries issues that may exist in the management areas. Section II provides a more detailed summary of all the major fisheries in the AYK Region. Included are a description and historical perspective of each fishery; fishery management objectives if established; description of recent performance of the fishery; a description of recent Board of Fishery actions in the fisheries; a discussion of any social or biological issues that may be associated with each fishery; and a description of any ongoing or recommended research or management activities directed at each fishery.

## **ABSTRACT**

An estimated 181,852 angler days of sport fishing effort occurred in the AYK Region in 1992, of which 120,848 angler-days were expended in the Tanana Area. An estimated 132,485 fish were reported harvested in the AYK Region sport fishery, of which 84,787 were reported harvested in the Tanana Area. The Salcha River estimated harvest of 47 chinook salmon is the lowest recorded in the 16-year data base. The estimated harvest of 615 coho salmon from the Delta Clearwater River in 1992 represents the lowest since 1984 and well below the recent seven-year average. A three year rehabilitation program was initiated for the Arctic grayling fishery on the Chena River. The program combines catch and release regulatory controls with stocking of hatchery and pond reared Arctic grayling to supplement natural reproduction. Fishing effort at Piledriver slough in 1992 was estimated to be 13,607 and continues to exceed levels from other single waterbodies in the Tanana area. Approximately 2.534 million fish of four species were stocked in waters of the Tanana Area. Fishery management plans were completed for six important fisheries in the region. The Alaska Board of Fisheries considered 13 proposals concerning sport fishing regulations in the AYK Region during 1992.

Key words: Arctic, Yukon, Kuskokwim, Tanana River, sport fishery, fishery management, recreation, harvest, effort, abundance, regulation, plans.

## **SECTION I: MANAGEMENT AREA OVERVIEW**

### **MANAGEMENT AREA DESCRIPTION**

The AYK Region encompasses the majority of the landmass of the state of Alaska (Figure 1). Included within the region are some 1,061,000 km<sup>2</sup>, some of the state's largest river systems (Yukon, Kuskokwim, Colville, and Noatak), thousands of lakes, and thousands of miles of coastline and streams. Regional coastline boundaries extend from Cape Newenham in the southwest, around all of western, northwestern and northern Alaska to the Canadian border on the Arctic Ocean (Figure 1). The region as a whole is very sparsely populated, with one densely populated center located in the Tanana River valley. Fairbanks (population about 31,000) is the largest community. The Fairbanks North Star Borough Census Area contains about 78,000 people. Other population centers in the region include the Yukon-Koyukuk Census Area with 8,500 people, Nome Census Area with 8,300 people, Southeast Fairbanks Census Area with 6,000 people, Northwest Arctic Borough with 6,100 people, Wade Hampton Census Area with 5,800 people, and the North Slope Borough with 6,000 people (Alaska Department of Labor (ADL) 1991).

The State of Alaska sport fishery program divides the AYK Region into three separate fishery management areas; the Tanana Area, the Northwestern Area (Norton Sound and Kotzebue), and the AYK Area. The Tanana River drainage is a separate management area because it contains population centers that have greater impacts upon fishery resources. Intensive, stock specific studies have been required in the Tanana Area to provide needed biological information for fishery management because of higher fishery exploitation rates in this area. Since 1990, the Sport Fish Division has assigned separate management responsibility to the upper Tanana River Valley and to the Northwestern Area (Norton Sound/Kotzebue).

The State of Alaska, by virtue of the Statehood Act asserts authority to manage fisheries and wildlife on all lands and waters of the state. Since 1990 however, the Federal agencies have



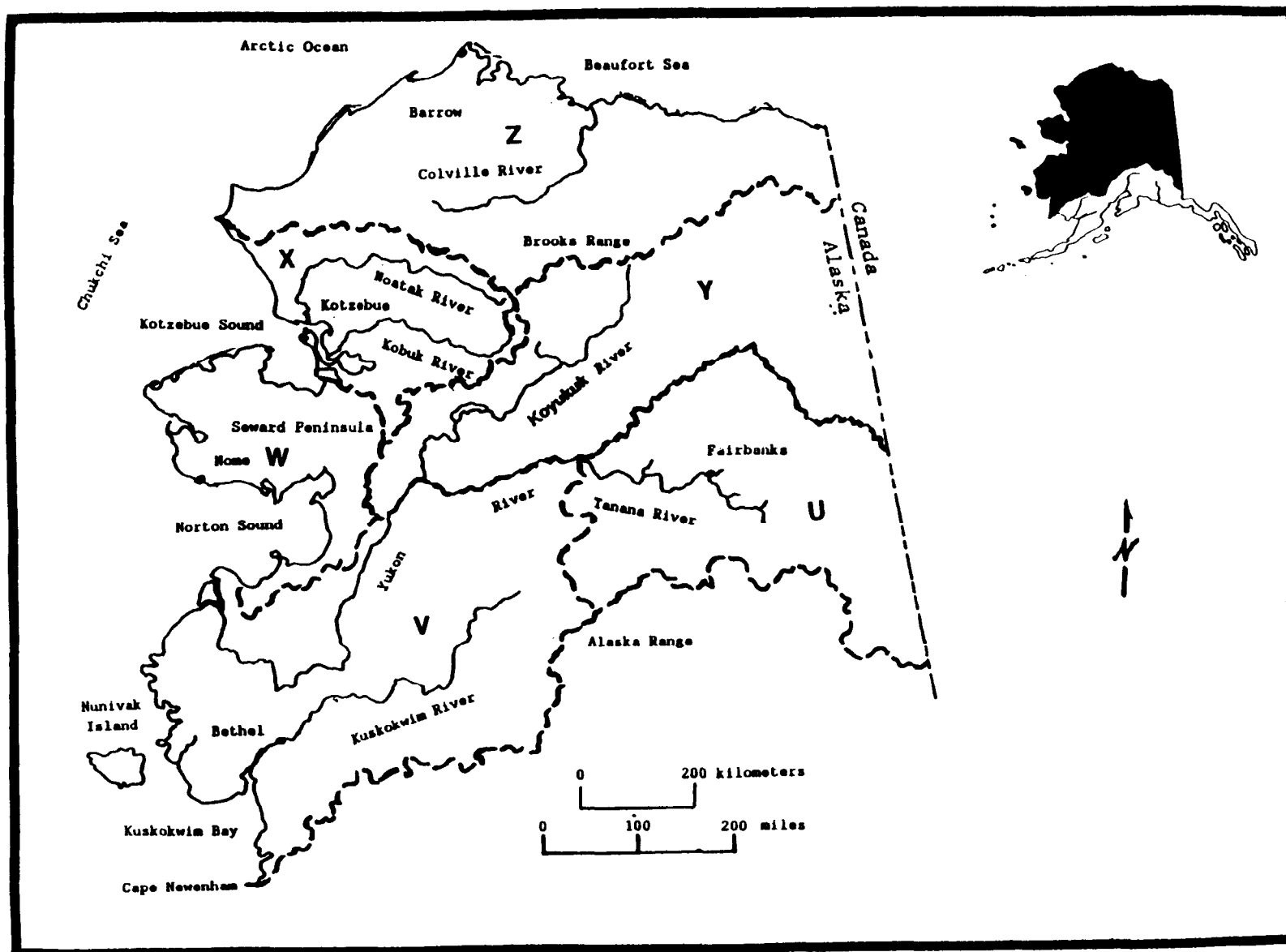


Figure 1.-The Arctic-Yukon-Kuskokwim Region. Dashed lines indicate boundaries between harvest reporting areas U - Z.

assumed management of subsistence hunting and fishing on Federal public lands and waters (approximately 42 million ha, compared to 88 million ha under federal jurisdiction).

Most sport fishing throughout the region is by private individuals fishing on their own. The sport fish guiding industry, while present in many of the region's best fishing waters, is not as large or well developed as in other parts of the state. Persons wishing to learn of guided fishing opportunities in the AYK Region should consult the special publication produced to list guide services by area, species and fishery (DeCicco and Barnes 1992).

## **TANANA AREA DESCRIPTION**

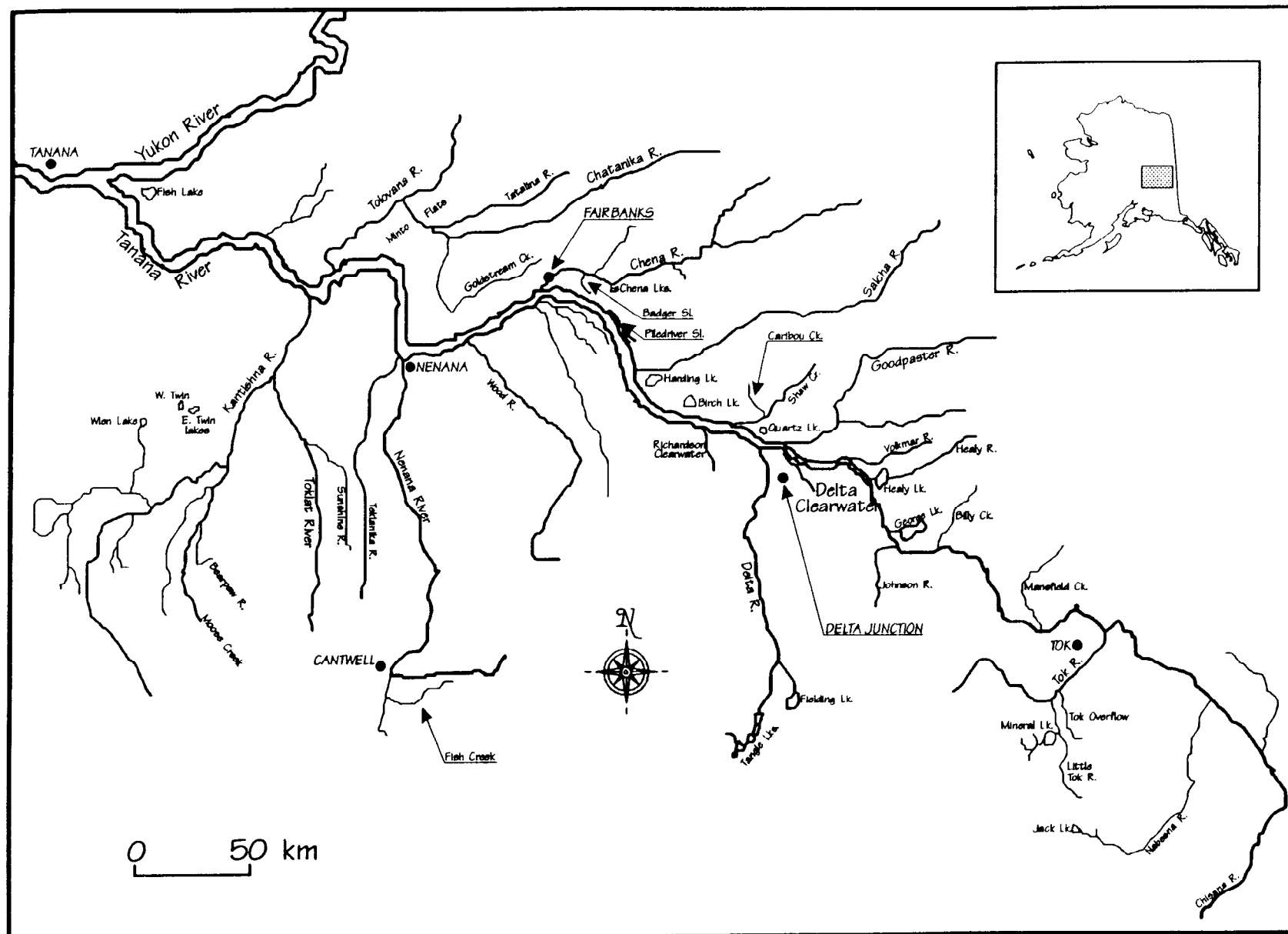
Prior to 1990, harvest reports for the Tanana Area included all southern drainages of the Yukon River from its confluence with the Tanana River near Tanana, east to the Canadian border. They also included the Alaska portion of the Fortymile and Sixtymile River drainages, the entire Tanana River watershed, and the Alaska portion of the White River drainage. Beginning in 1990, only the Tanana River watershed is considered to be part of the Tanana Area for the purpose of harvest reporting. Harvest reports from all other portions of the upper Yukon River are now included in the AYK Area.

The Tanana River basin (Figures 2-6) is an area of approximately 116,500 km<sup>2</sup> (11.7 million ha). The main river is a large glacial stream formed at the confluence of the Chisana and Nebesna rivers near Tok. After flowing downstream in a general northwesterly direction for some 917 km, it joins the Yukon River at Tanana. It is the second largest tributary of the Yukon River; the drainage area of the Porcupine River is slightly larger. The Tanana River receives most of its water volume and sediment loads from streams draining the glaciers of the Alaska Range and the Wrangell Mountains. All major tributaries entering the north side of the Tanana River originate in the Tanana Hills uplands and are clear in both winter and summer except for relatively short periods after heavy rains and during the spring period of snow melt. They include the Goodpaster, Salcha, Chena, Chatanika, and Tolovana rivers. Rivers flowing from the Alaska Range and the Wrangell Mountains and entering the south side of the Tanana River are of glacial origin. They include the Chisana, Nabesna, Tok, Delta, Nenana, and Kantishna rivers (Figure 2).

### **Lake and Stream Resources**

Alluvial aquifers associated with porous floodplain gravels store water and stabilize winter flows in the upper Tanana River and some of its tributaries near Delta Junction, the Nenana River, and in the Toklat River, a tributary to the Kantishna River. All the large aquifers are located on the south side of the Tanana River and are associated with sub-surface water flows from the north slope of the Alaska Range. The Delta Clearwater and Richardson Clearwater rivers (Figures 2 and 3) are the most important sport fishing streams originating in these aquifers. The few on-stream lakes present (lakes that drain into a stream tributary to the Tanana River or into the Tanana River itself) in the drainage are of insufficient volume to sustain flow in the Tanana River during winter or through dry summers. Headwater glaciers provide water storage that maintains stream flows in dry summers (Selkregg 1976).

Lake development in the Tanana basin is not as extensive as in many other parts of Alaska. Some 20 lakes within the drainage exceed 26 km<sup>2</sup> in surface area (Selkregg 1976). Many of these lakes are important for sport fishing because of wild or stocked species present. Primary lakes for sport fishing within the Tanana River drainage are Harding, Birch, Chena, Quartz, Volkmar, George, Fielding, and Tangle lakes (Figures 3 and 4). Volkmar and George lakes have no roadside access.



**Figure 2.-The Tanana River drainage**

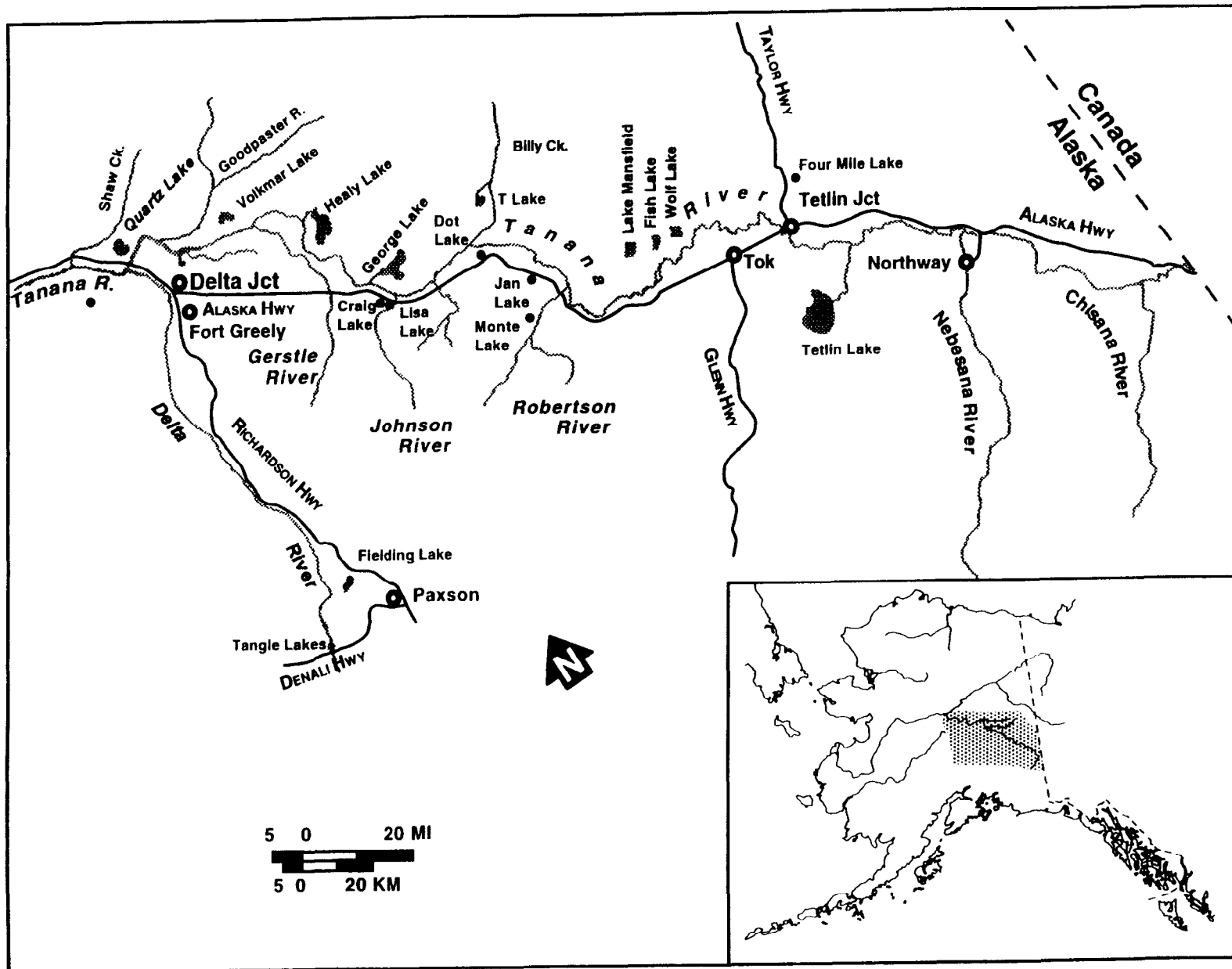


Figure 3.-Waters and highways of the middle Tanana River valley.

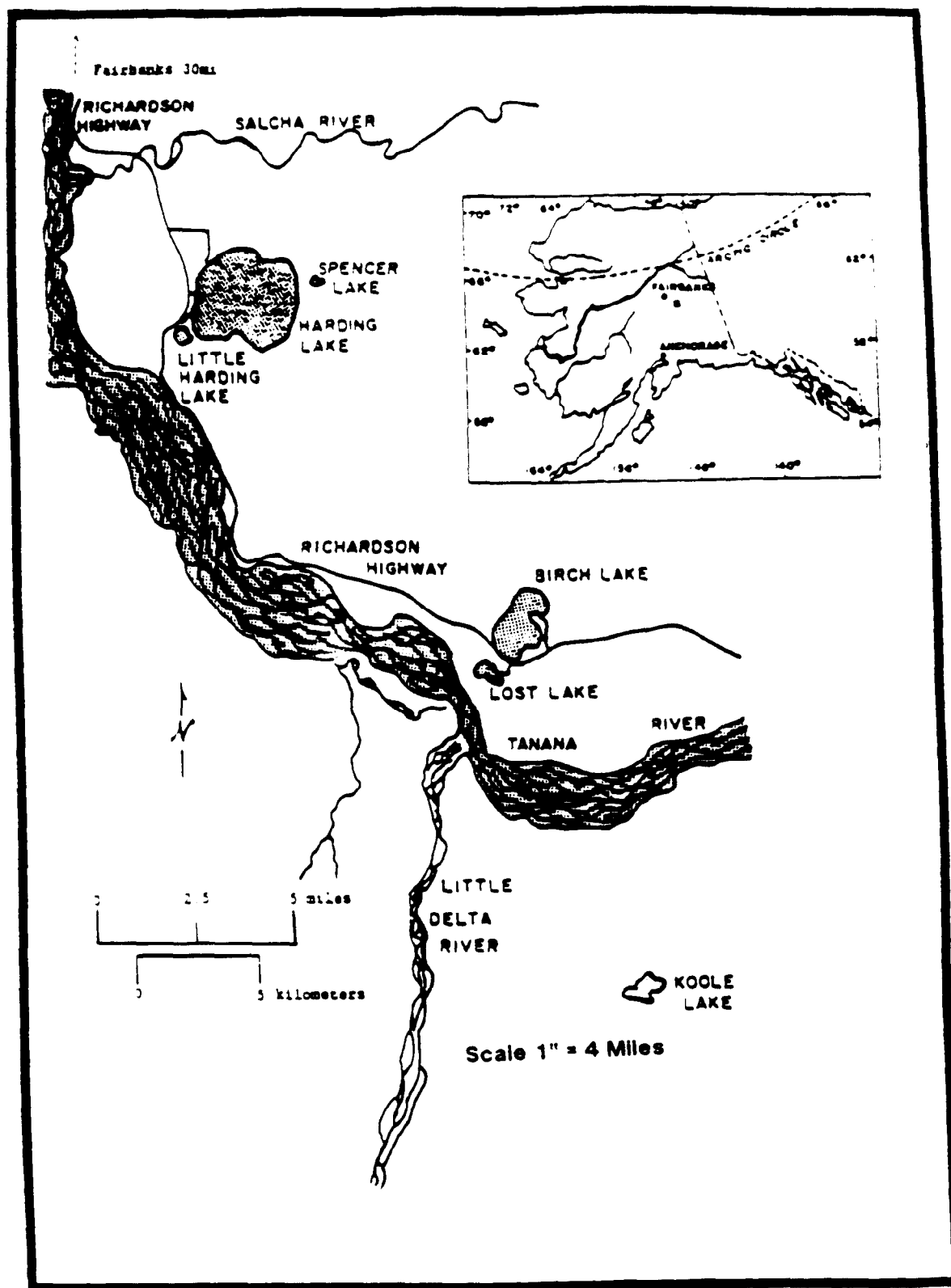


Figure 4.-Tanana River waters near Fairbanks.

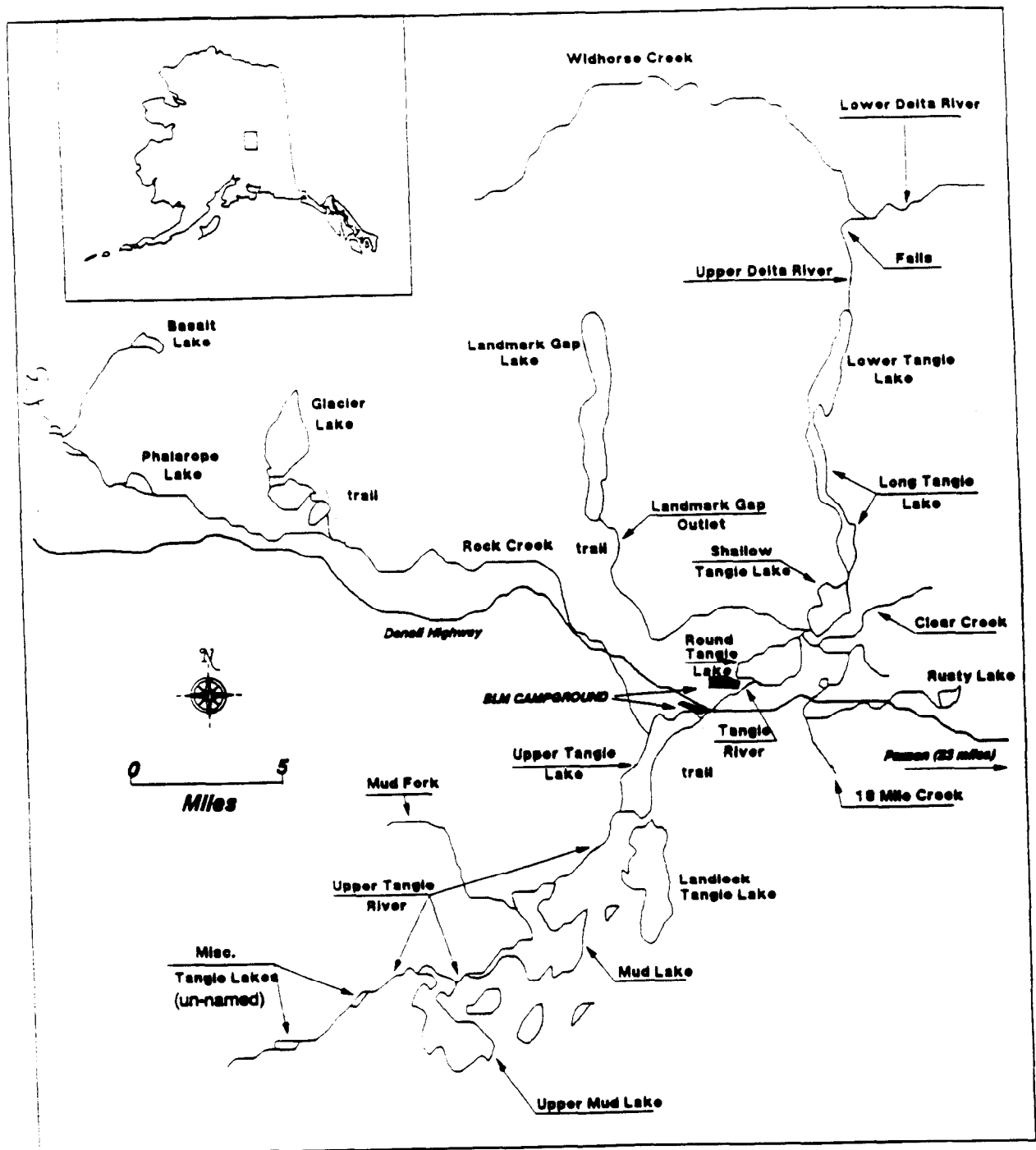


Figure 5.-Map of the Tangle Lakes system.

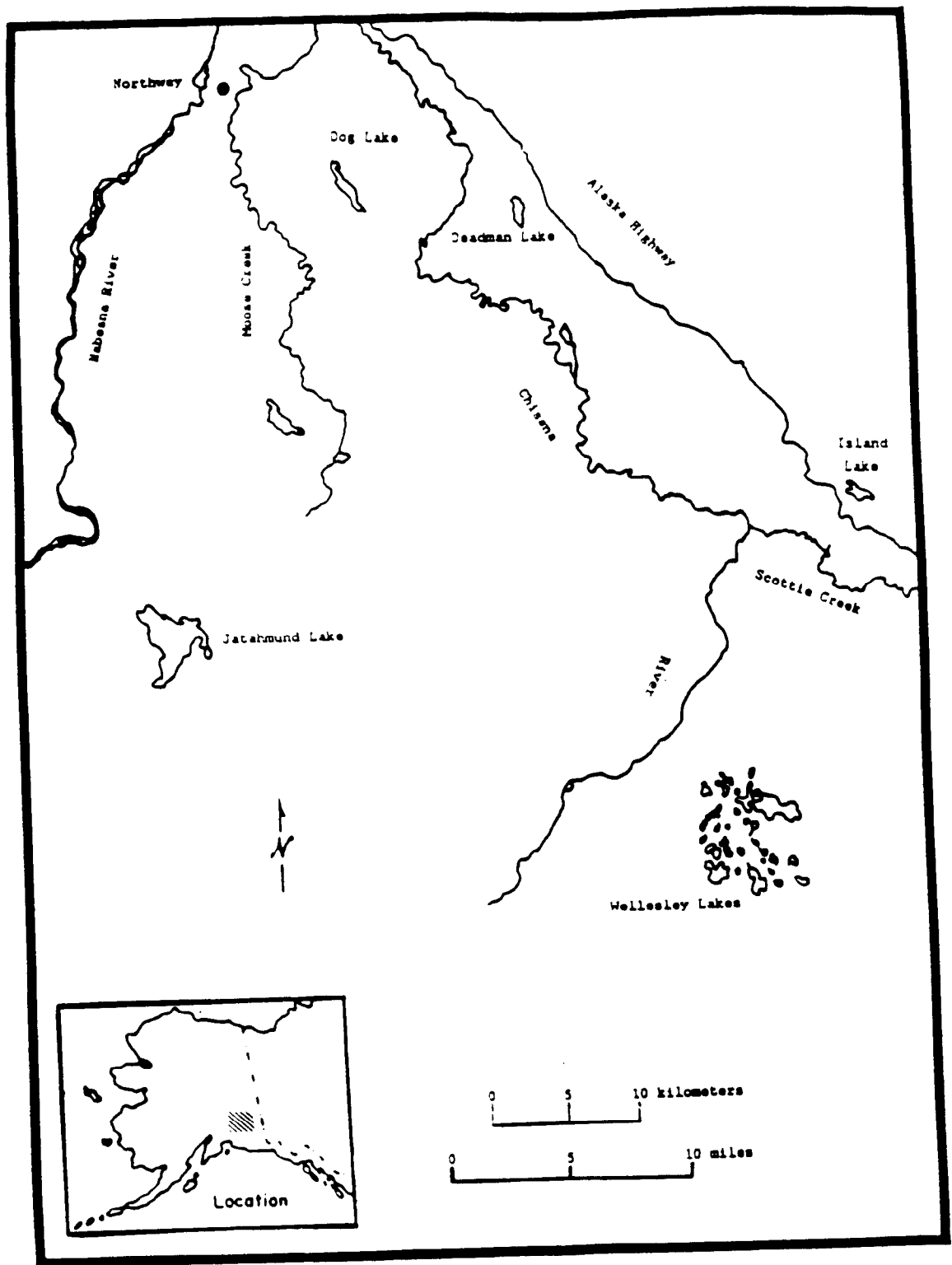


Figure 6.-Tributaries of the upper Tanana River.

Chena Lakes (Figure 2) in the lower Chena River basin were created by gravel removal to erect flood control structures during the 1970's.

## **ARCTIC, YUKON, AND KUSKOKWIM AREA DESCRIPTION**

The AYK Area consists of some 562,000 km<sup>2</sup> (37% of the entire land area of Alaska) of extremely varied topography, climate, and zoogeography. Land ownership and jurisdictions fragment this huge area into a complex mosaic. The federal government is the major land manager through its jurisdiction over lands in National Parks and Preserves, National Wildlife Refuges, Wild and Scenic Rivers, as well as other classifications of federal lands. Native corporations, State of Alaska and private lands comprise the rest. For purposes of reporting and organizing statistics in the Sport fish Statewide Harvest Survey (SHS), the AYK Area is subdivided into three sub-areas; Yukon (Y), Kuskokwim (V), and Arctic (Z) (Figure 1).

### **Geographic and Geologic Setting**

Dominant features of the landmass that lies north of the Alaska Range divide include the Alaska Range itself which provides water for streams in the Kuskokwim drainage and to the Tanana River and its tributaries. The Brooks Range and its drainages supply water to the Koyukuk, and Porcupine rivers in the Yukon River drainage, and to streams that drain directly into the Arctic Ocean and the Chukchi Sea.

### **Lake and Stream Resources**

Sport fishing waters and opportunities are extremely varied as could be expected in an area so large and diverse. In the following section the primary fishing waters and species of interest will be briefly characterized in each of the sub-areas within the AYK Area. It is recognized that not all streams, lakes, or fish stocks of importance receive attention in this cursory treatment.

## **RURAL ALASKA SPORT FISHING**

The vast majority of the AYK Region and its fishable waters occur away from highways and motor vehicle roads of any kind. Small communities are scattered along the major river systems of Interior Alaska and along the coast of western Alaska as well. The communities are invariably located near water, either on a river or lake because of the importance of fish as a food source to native people historically and today. Native communities harvest a substantial amount of fish and game resources for personal subsistence use, but fishing is usually conducted with high catch-per-unit-of-effort gear types such as fish wheels and nylon gillnets. Recreational, or sport fishing with rod and reel is practiced to some extent by rural residents, but often as an extension of subsistence activities and less for recreational purposes. Consequently, harvest estimates of sport caught fish from rural Alaska are generally low because local residents usually fish under subsistence regulations and because the small amount of sport fishing done is usually conducted as a subsistence activity. Since statewide harvest estimates are based upon surveys of licensed sport fishers, the rural harvests may not be documented fully.

### **Yukon River Sub-area**

The Yukon is the largest river in Alaska and its drainage constitutes the fifth largest in North America. The river originates in the basin and range domain of the southern Yukon Territories and northern British Columbia, and flows over 3,700 km northwest to its mouth on the Bering Sea coast. Additional Canadian flows to the upper Yukon River watershed are added from glacial streams such as the White River which originates in the Wrangell and St. Elias Mountain ranges.



Approximately one-third of the Yukon River watershed is in Canada. The total drainage area of the Yukon River is approximately 866,000 km<sup>2</sup>, including the area in Canada. Map figures that include the Yukon River and major drainages include Figures 7 - 13. Approximately three quarters of the land area of the AYK Region is in the Yukon River drainage. The entire mainstem of the Yukon River up to the confluence of the White River (Figure 8) in Canada is turbid from glacial silt entrained in the waters draining the Alaska, St. Elias, and Wrangell Mountain ranges.

The Yukon sub-area (statewide harvest Area Y; Figure 1) includes drainages of the Yukon River from the south slope of the Brooks Range to the Bering Sea, from Naskonat Peninsula north to Pastol Bay; from the Canadian border west to the Bering Sea. This sub-area does not include any portion of the Tanana or Kuskokwim river watersheds. Prior to 1990 the Lower Yukon and Kuskokwim rivers were combined into a single sub-area for Sport Fish Division reporting purposes. Separate harvest reporting for the two river drainages has been established since 1990.

Clear water streams with sport fishing potential are extremely numerous in the Yukon River drainage and extend to third and fourth order tributaries. Although the main stem of the river flows for approximately 3,200 km, (with the upper third in Canada) this report considers Alaska waters only.

The lower Yukon River provides a migratory corridor for all the species of resident, anadromous, and semi-anadromous fishes of the drainage. In addition, many species, such as sheefish, northern pike, several whitefish species, burbot and lingoes suckers utilize the mainstem lower river for rearing and feeding, particularly during winter months. For some species such as burbot, the Yukon River mainstem provides year-around habitat.

Near the Yukon River mouth, (Figure 9) the east and west forks of the Andreafsky River are both high quality sport fishing streams and have been designated as Wild and Scenic Rivers (Wild and Scenic Rivers Act 1968; Alaska National Interest Lands Conservation Act (ANILCA) 1980). All the Pacific salmon species, with the exception of sockeye salmon *Oncorhynchus nerka*, occur in the rivers as do Arctic grayling, Dolly Varden *Salvelinus malma*, and northern pike (in sloughs and lakes off the rivers). Each fork of the Andreafsky River is in itself a major stream and they drain extensive remote areas of the Nulato Hills between the Yukon River Delta and Norton Sound.

The Innoko River and its tributaries drain a large area of flat wetlands and foothills of the Kuskokwim Mountains. The Innoko River enters the Yukon River a few miles downstream of the village of Holy Cross. The Innoko River system of tributaries and wetlands contains numerous northern pike and whitefish as well as other species. A small sockeye salmon stock may spawn in the system, in addition to chum *Oncorhynchus keta*, chinook salmon and coho salmon, but there is no evidence that the Innoko River is important for salmon production when compared to other known productive streams in the Yukon River drainage. Much of the lower Innoko River is included in the southern unit of the Innoko National Wildlife Refuge.

The Anvik River, which enters the Yukon River near the village of Anvik about 515 km upstream from the mouth, is a highly productive stream. The river courses eastward from its drainage area in the Nulato Hills for about 130 km and although it is primarily a rapid runoff stream, artesian upwelling helps stabilize winter flows and water temperatures. Besides supporting the largest chum salmon spawning stock in the Yukon River drainage, with over a million individuals spawning in some years (Whitmore et al. 1987), the stream supports healthy populations of

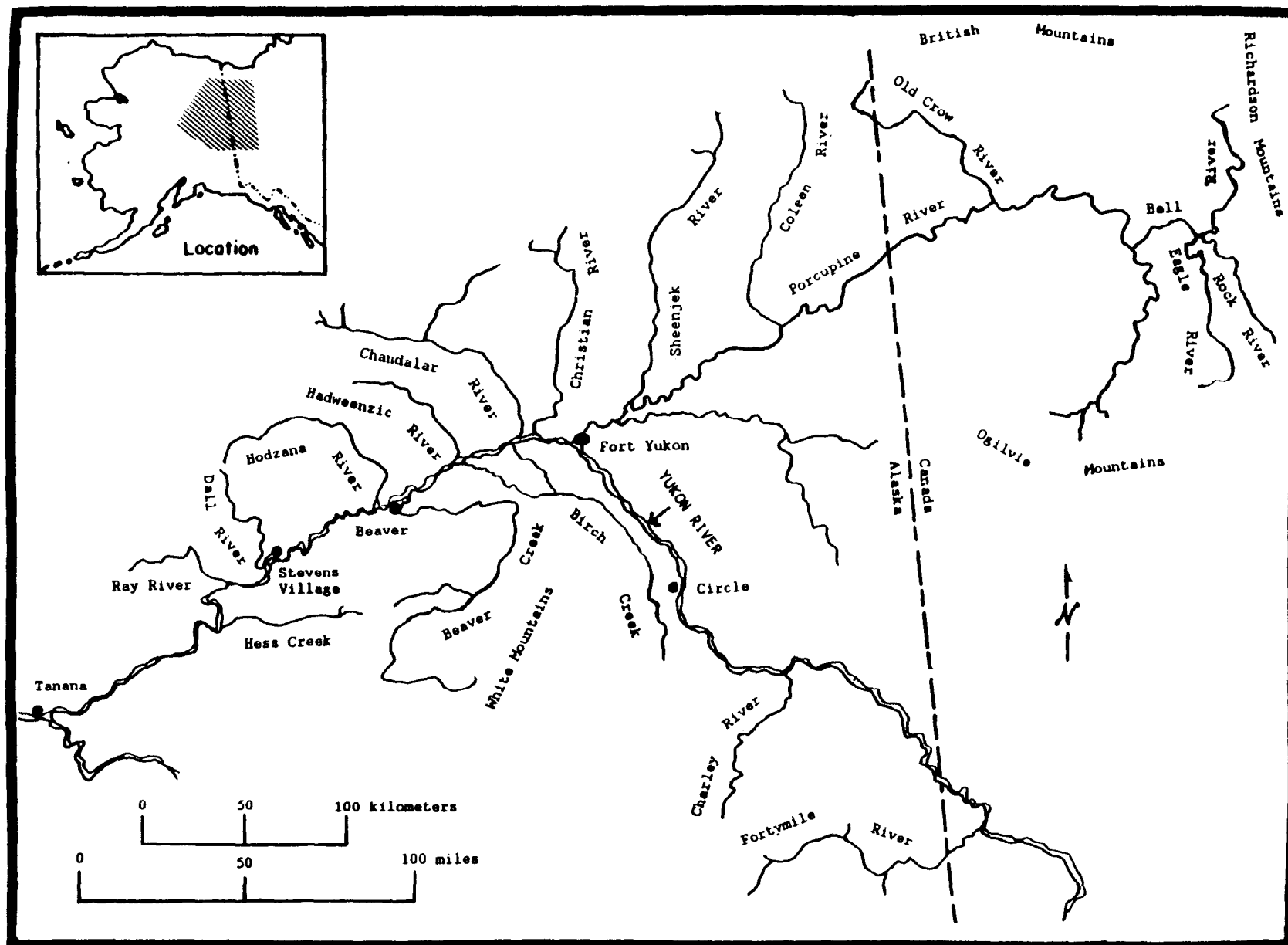


Figure 7.-Middle Yukon River and Porcupine River drainages.

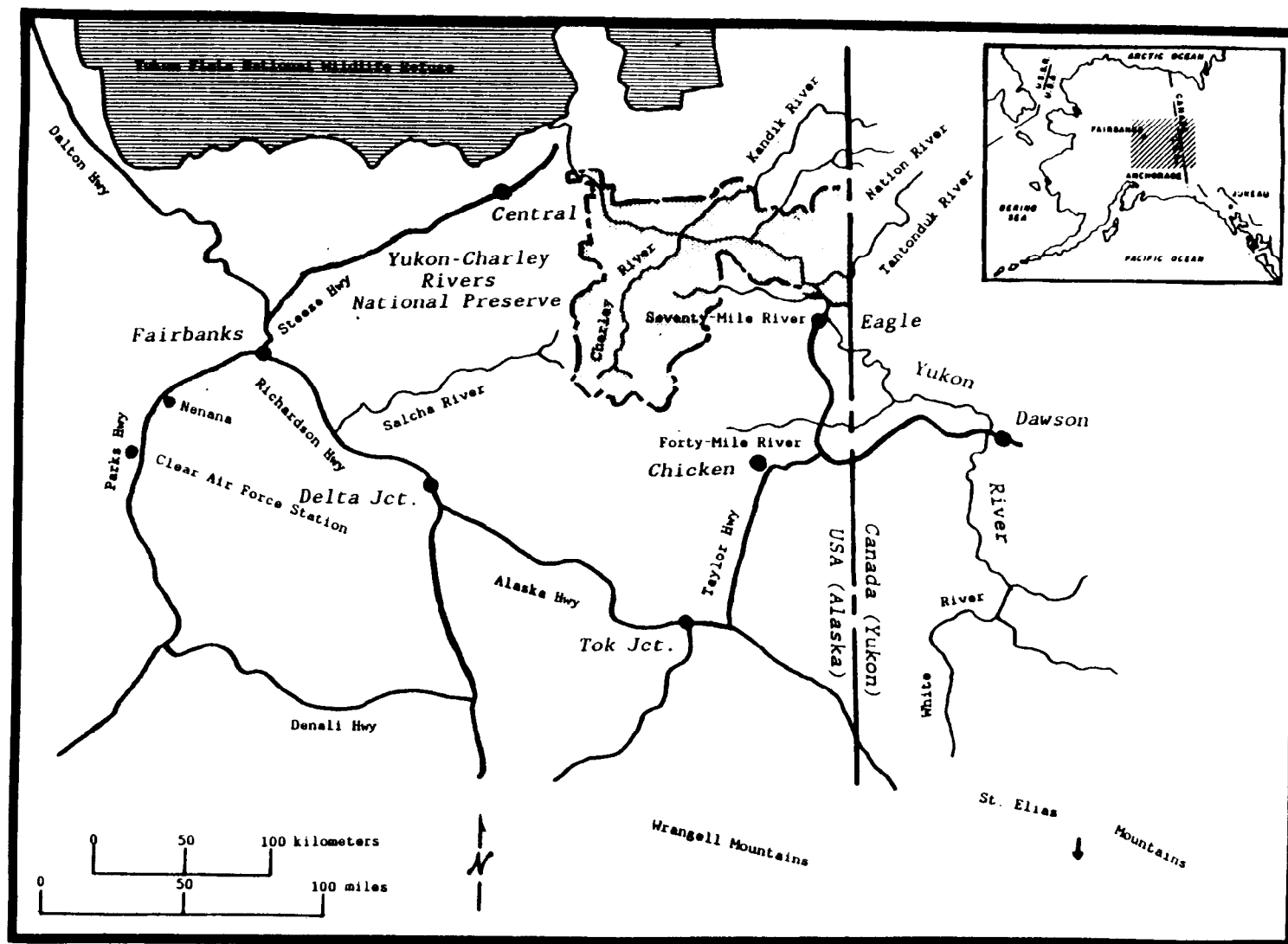


Figure 8.-Major highways in interior Alaska.

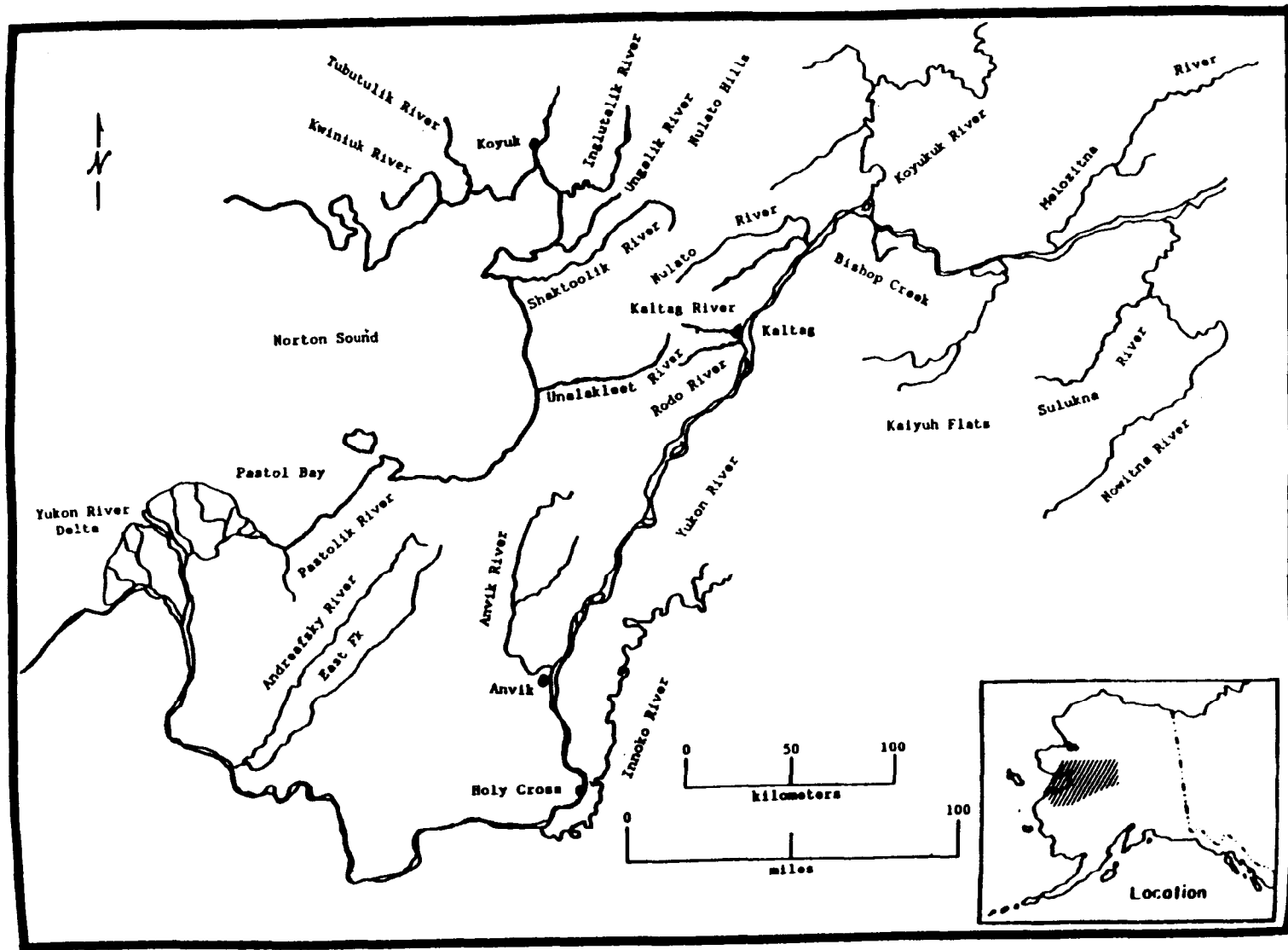


Figure 9.-Lower Yukon River and eastern Norton Sound drainages.

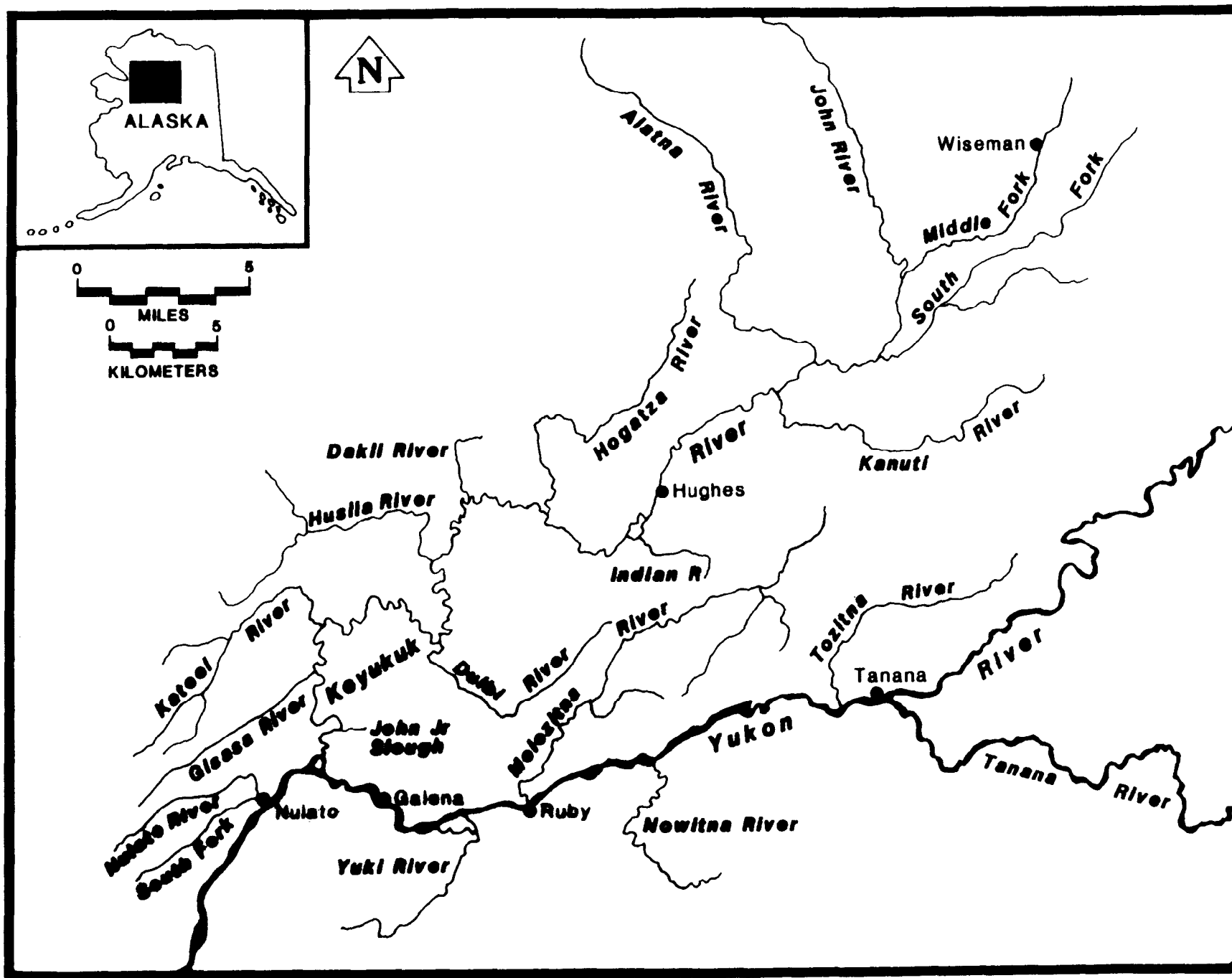


Figure 10.-Middle Yukon River and Koyukuk River drainages.

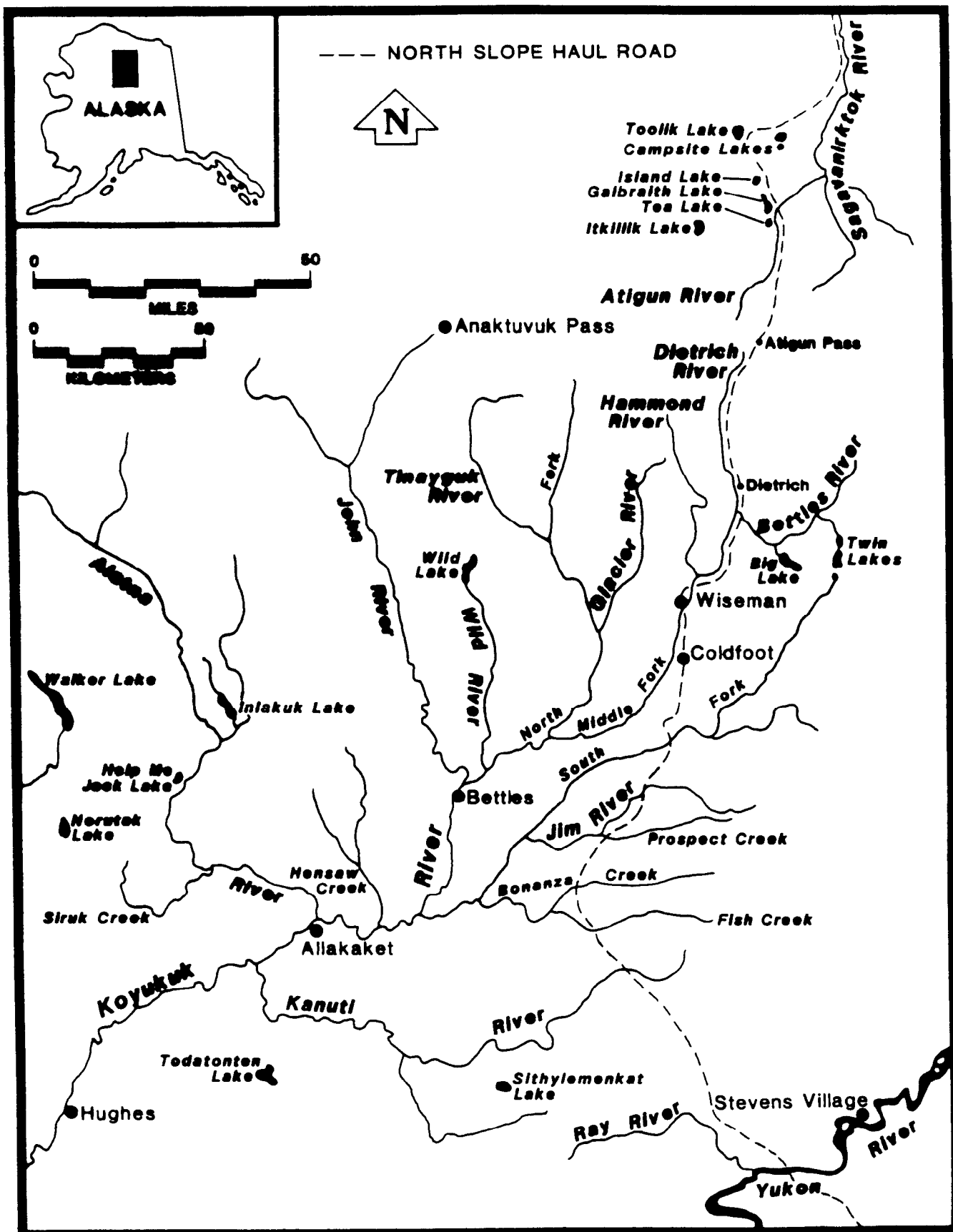


Figure 11.-Upper Koyukuk River and North Slope Haul Road.

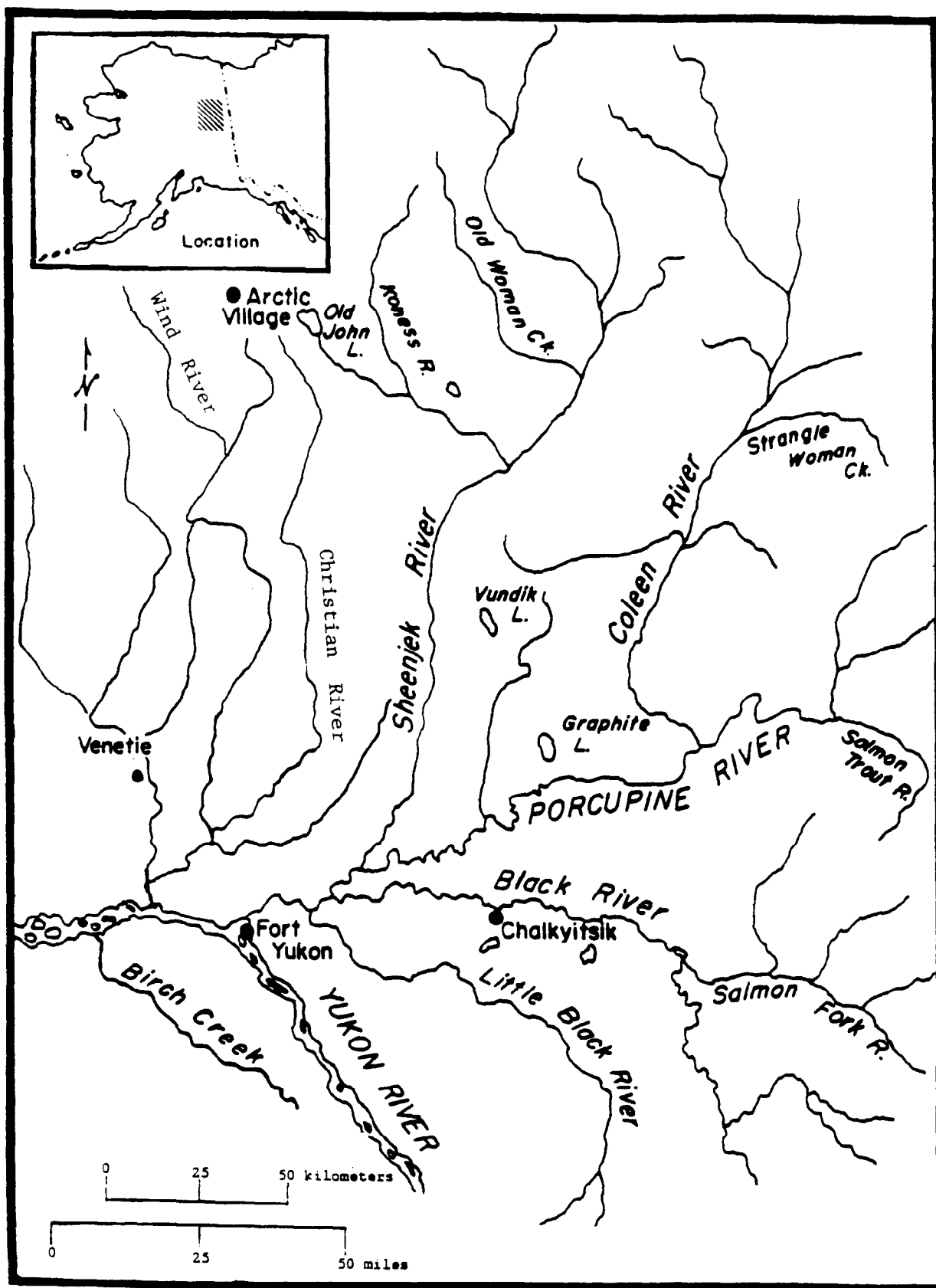


Figure 12.-Porcupine River drainage.

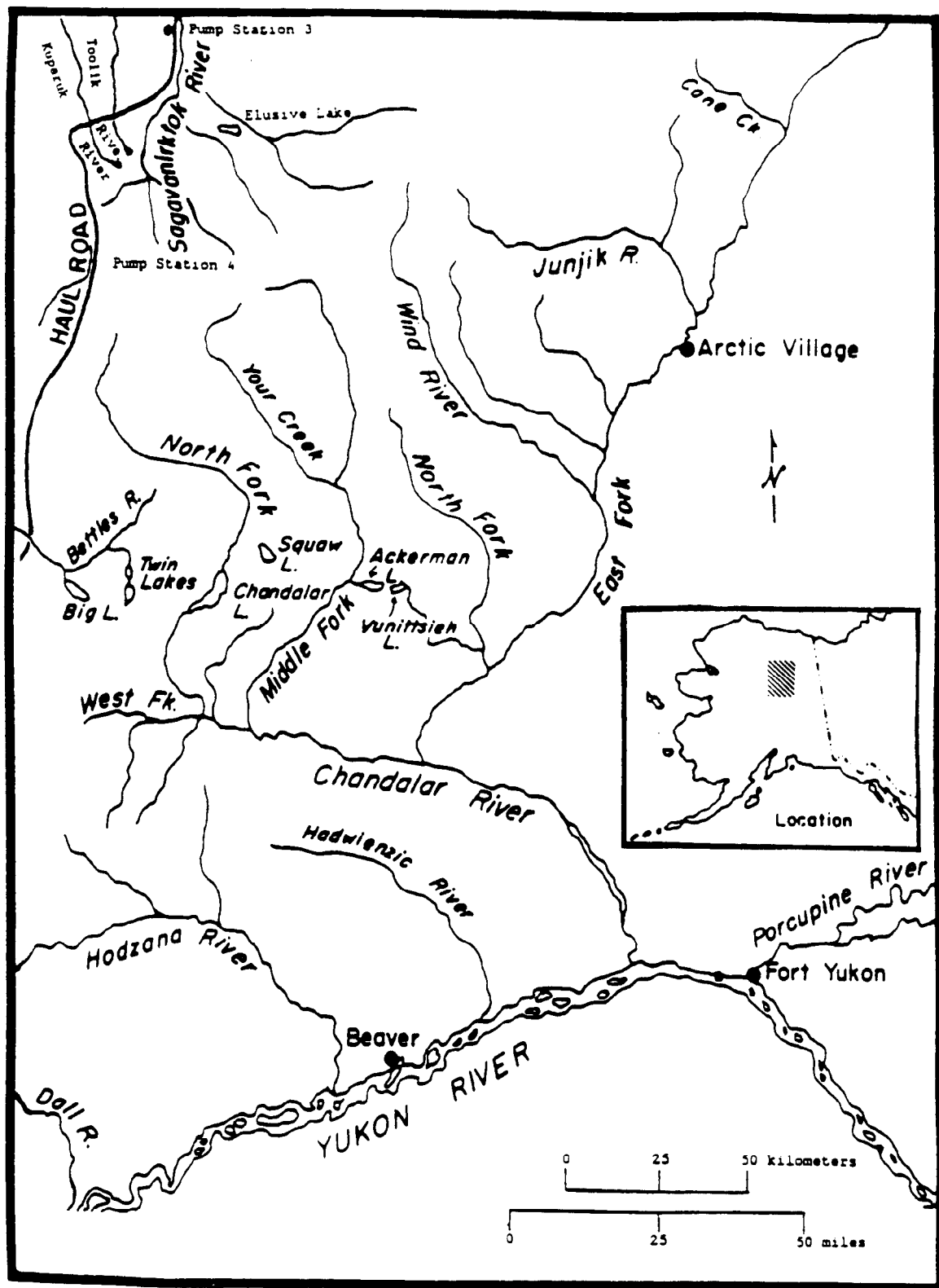


Figure 13.-Chandalar River system.



chinook salmon, Arctic grayling, Dolly Varden, and northern pike. Coho salmon have been observed spawning in the Anvik River (Barton 1984) but the status of this population is not known. The quality of angling is excellent, but few anglers use the stream during the summer season because of its remoteness and difficult access.

The Kaltag and Rodo river mouths, and Bishop Creek mouth support sheefish and Arctic grayling fisheries during summer and early fall months. Sport fishing for northern pike is common in sloughs and lakes near the main stems of the Yukon and Koyukuk rivers as well as in the extensive Kaiyuh Flats southeast of Galena.

The Nowitna River, whose confluence with the Yukon River is upstream from Ruby, is a major clear tributary which enters the Yukon from the south and drains the north slope of the Kuskokwim Mountains. It was designated as a Wild and Scenic River in 1980 (Alaska National Interest Lands Conservation Act, P.L. 96-487), and supports a significant amount of sport fishing. Most sport fishing is done by Fairbanks residents using personal riverboats or aircraft to reach the river. Good angling for sheefish, northern pike and Arctic grayling can be found in the system, which consists of several branches. Most of the main stem and major tributaries are included in the Nowitna National Wildlife Refuge (U.S. Fish and Wildlife Service (USFWS) 1987b). Sheefish spawn in the Sulukna River tributary (Alt 1987).

Few lakes of sufficient area or depth to influence winter flow volume or temperature are present in the Alaska Yukon River drainage. The majority of the lakes in the lower Yukon drainage developed when saturated permafrost soils thawed and as a result, these lakes are mostly shallow. There are thousands of such lakes throughout the delta and floodplains of the drainage. Many provide summer feeding and rearing for various whitefish species, as well as for northern pike and occasionally, sheefish. Fish utilizing shallow lakes for summer feeding generally move into primary tributaries and main stems of larger rivers prior to freeze-up.

A significant portion of the Yukon River drainage along the south slope of the Brooks Range is within the boundaries of the Gates of the Arctic National Park and Preserve. Most of the streams in the sub-area drain to the south from the Brooks Range into the Porcupine, Koyukuk, and Yukon rivers (Figures 10, 11, 12, and 13). Significant flowing waters include the Alatna River, and other Koyukuk River tributaries such as the Gisasa, Kateel, Dulbi, Huslia, Indian, Kanuti, Hogatza, Dakli, Henshaw, John, Wild, North Fork, Tinayguk, South Fork, Middle Fork, and Jim rivers. To the east are the Dall, Hodzana and Hadweenzic rivers, the Chandalar River with several tributaries and forks, the Christian River, and the lower Porcupine River with tributaries such as the Sheenjek, Coleen, Black, and Little Black rivers. The Dalton Highway (North Slope Haul Road) bisects the sub-area in a north-south direction (Figure 11), and provides access for sport fishermen to several streams of the area, including the Ray River, the Middle Fork and South Fork of the Koyukuk River, as well as Prospect Creek and Jim River of the upper Koyukuk River system.

The Nulato River enters the Yukon River near Nulato, about 775 km from the mouth of the Yukon River. Smaller and more difficult to navigate than the Anvik River, the stream nevertheless has sport fishing potential for salmon, Arctic grayling, Dolly Varden and northern pike. The stream receives some seasonal sport fishing use at the present time from anglers stationed at a U.S. Air Force station in Galena and from Nulato residents.

Sport fisheries for sheefish and Arctic grayling during summer and early fall occur at or near the mouth of the Melozitna River, which enters the Yukon River at Ruby. Geothermal hot springs occur on one of the creeks of the Melozitna River. The Melozitna River is utilized frequently by local fishermen for Arctic grayling and Dolly Varden, particularly in the lower 16 km below rapids which effectively isolate the upper reaches of this stream from boating access.

The Koyukuk River, one of the largest first-order tributaries of the Yukon, enters the Yukon River downstream from Galena, about 820 km upstream from the Yukon River mouth (Figures 10 and 11). The main stem of the Koyukuk River is turbid in its lower reaches from tannic stain, and entrained sediments from bank erosion. Lower Koyukuk River tributaries such as the Gisasa, Kateel, Dulbi, and Indian rivers are little known outside of the local area but seasonally provide good sport fishing opportunities. Sheefish are taken at the mouths of several streams including the Kateel and Dulbi rivers and where John Junior Slough meets the Koyukuk River about 32 km upstream from the mouth. Sheefish have been found to spawn in the Koyukuk River in the reach between Hughes and Allakaket and in the Alatna River (Alt 1987). Arctic grayling are common in clear tributary streams and local residents of nearby villages as well as military personnel stationed at the Galena Air Station fish for them. Sport fishing for northern pike takes place in sloughs and lakes near the main stems of the Yukon and Koyukuk rivers as well as in the extensive Kaiyuh Flats southeast of Galena. Since sheefish spawn in the main stem of the Koyukuk River near Hughes, there are both immature and adult mature prespawning individuals present in the lower Koyukuk River throughout the summer prior to the September spawning period (Alt 1987).

Other Yukon River tributaries below the Porcupine River confluence that support sport fishing include the Tozitna River, Ray River, Dall River, Hodzana River, Hadweenzic River, Chandalar River (Figures 7 and 13), and Christian River (Figure 12). Upper Koyukuk River tributaries that cross the Dalton Highway (North Slope Haul Road) are illustrated in Figure 11.

The Yukon Flats is an extensive wilderness wetland between Circle and Stevens Village below the confluence of the Porcupine River. Thousands of shallow thaw lakes have developed throughout the flats. Many of the lakes support fish populations, at least seasonally, especially those with occasional connections to the sloughs and streams in the area. Northern pike and whitefish species are most common to this area, but sheefish and Arctic grayling also occur in some waterways (USFWS 1985). Salmon production is very limited in the Yukon Flats proper. The area between Beaver Village and Fort Yukon on the Yukon River main stem may support spawning sheefish (Alt 1987). This sub-area contains approximately half of the Yukon Flats National Wildlife Refuge, (Figure 13) and there are literally thousands of lakes present of various sizes and origins. The lakes of the area are categorized roughly (USFWS 1985) into: (1) foothill lakes (formed from streams, with sufficient depth for fish habitation); (2) tundra lakes (which are shallow and often freeze to the bottom); and (3) lowland lakes of three types: oxbow lakes with river connections and deep enough to support fish, mud lakes (shallow, and suitable only for fish rearing), and lakes created from beaver activity. There is currently little documentation available on resident fishes that utilize these vast wetlands. The U.S. Fish and Wildlife Service is conducting inventories and lake surveys in the waters of the Yukon Flats Refuge to provide information on this subject.

The Porcupine River (Figure 12) is the largest Yukon River tributary, draining an immense area of the eastern Brooks Range through the Sheenjek and Coleen rivers, the British Mountains through

the Old Crow River, the Richardson Mountains in Canada through the Bell, Eagle, and Rock rivers, and the northern Ogilvie Mountains in north-central Yukon Territories through the East Porcupine Fork and its tributaries. The Black River which drains the southeastern slopes of the Ogilvie Mountains is one of its major Alaska tributaries. The Little Black River drains a lowland area south of the Black River parallel to the main stem of the Yukon River.

Other major tributaries upstream of Fort Yukon into Canada include the Charley, Seventymile, and Fortymile rivers on the south side of the Yukon River and the Nation, Kandik, and Tatonduk rivers entering the north side of the Yukon River (Figure 8). Parts of Birch and Beaver creeks as well as parts of the Charley and Fortymile rivers are designated as National Wild and Scenic Rivers (Appendix A). The major species for sport fishing on the rivers upstream of Fort Yukon are Arctic grayling in the upper stream reaches and northern pike in the lower sections and sheefish near the river mouths.

Several large mountain lakes are present. They include Iniakuk, Wild, Big, Twin, Chandalar, Ackerman, and Old John lakes (Figures 11, 12 and 13). All contain populations of lake trout and Arctic grayling and species of whitefish and cisco in most cases.

### **Kuskokwim River Sub-area**

The Kuskokwim River sub-area (Statewide harvest area V, Figure 1) includes the Kuskokwim River watershed and all waters flowing into Kuskokwim Bay; adjacent salt water from Cape Newenham north to the Naskonat Peninsula (north of Nelson Island) and Nunivak Island<sup>1</sup>. Total land area in the sub-area is approximately 150,000 km<sup>2</sup>, 17% of the area encompassed by the Yukon River drainage in Alaska and Canada.

The Holitna River is the most productive stream for sport fishing in the Kuskokwim River drainage (Figure 14) above the Aniak River confluence, because of the diversity and abundance of its resident and anadromous species. Approximately six fishing guides provide services on the river to about 75 clients per year (Rue et al. 1987). No permanent lodge or tourist structures exist on the river. The Holitna River supports populations of Dolly Varden, Arctic grayling, northern pike, burbot, sheefish, various whitefish species and all five Pacific salmon species. Rainbow trout do not occur upstream of the Aniak River in the Kuskokwim River drainage. Dolly Varden, coho salmon, and chinook salmon are the primary sport fish species in the Holitna River, although feeding sheefish are present in the summer as far upstream as the Hoholitna River (Alt 1987) and are sought by some anglers. The Stony, Swift, Gagaryah, Tatlawiksuk, Cheeneetnuk, and Hoholitna rivers represent some of the other important middle Kuskokwim River tributaries. All originate in the Alaska Range and its foothills (Figure 14). Fishery resources of these streams have not been fully documented, and because of remoteness and limited access, receive only light use by anglers.

Upstream of McGrath (Figure 15) in the upper Kuskokwim drainage, there are many tributaries that originate in the Alaska Range, such as the Big River, the Middle, South, Windy, Big Salmon, Slow, and East forks of the Kuskokwim River, as well as the Tonsona and Little Tonsona rivers

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<sup>1</sup> The Sport Fish Division assigns management responsibility for Kuskokwim Bay and Kuskokwim River waters upstream to Aniak to its Southcentral Region headquartered in Anchorage. Responsibility for these areas is assigned to Sport Fisheries staff stationed in Dillingham.

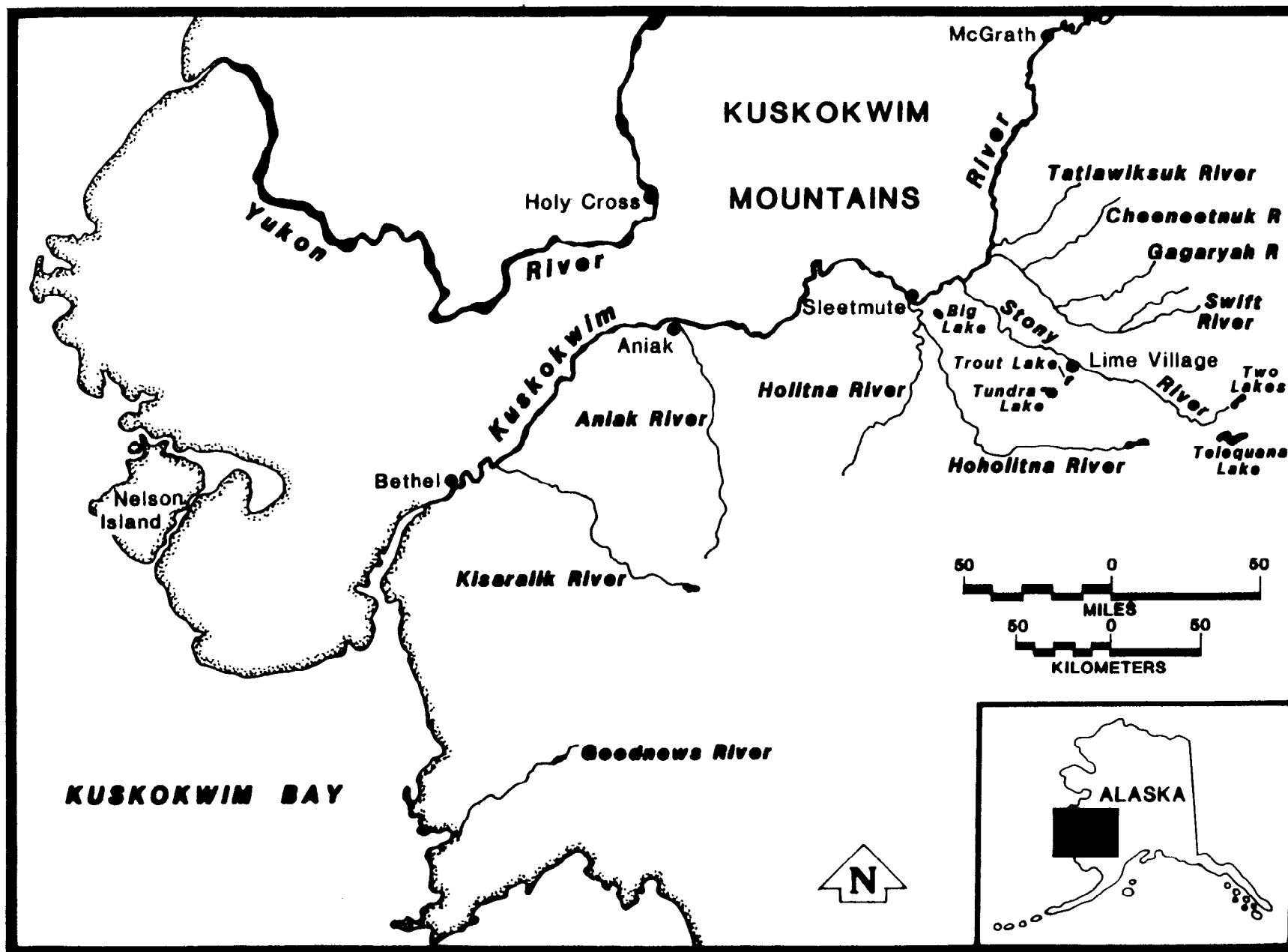


Figure 14.-Waters of the lower Kuskokwim River valley.

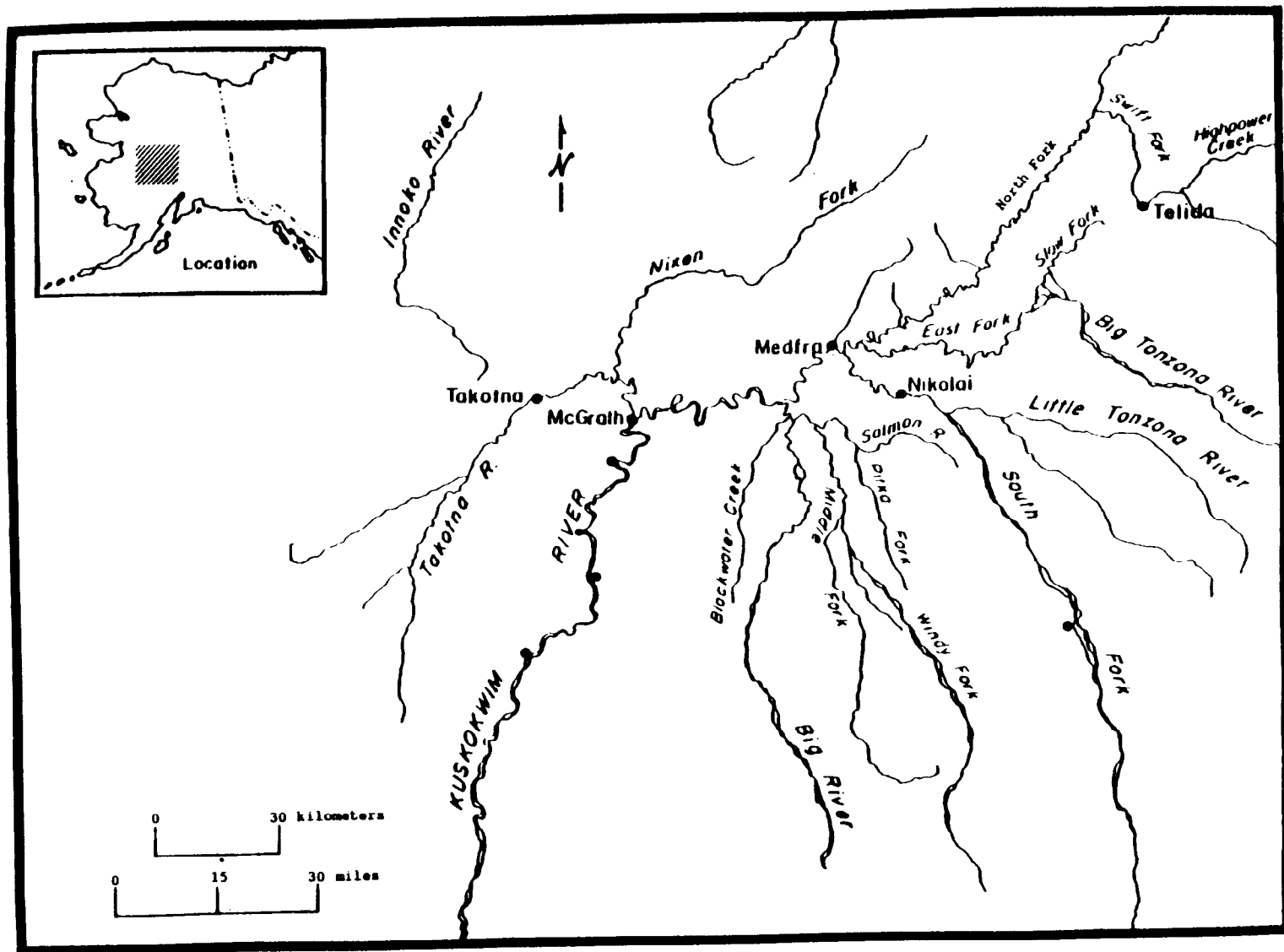


Figure 15.-Waters of the upper Kuskokwim River valley.

and Highpower Creek near Telida. The North Fork, Nixon Fork, and Takotna rivers originate in the Kuskokwim Mountains west of the Kuskokwim River. Chinook, coho, and chum salmon spawn in streams of the upper Kuskokwim drainage, as do sheefish. Sheefish spawning has been documented in Big River and in Highpower Creek (Alt 1987). Although most of the primary sport fish species occur in the middle and upper Kuskokwim River drainage, (with the exception of rainbow trout), sport fishing effort is extremely light on most streams. Most fishing exploitation in the middle and upper part of the drainage occurs in local subsistence fisheries that mainly target salmon and whitefish.

The few lakes found in the Kuskokwim River drainage above the Aniak River have limited potential for sport fisheries. The fisheries resources in two lakes (Telequana and Two lakes; Figure 14) in the upper Stony River were surveyed by Russell (1980), and Whitefish Lake in the upper Hoholtna River was surveyed in 1977 by Baxter (1977). Lake trout, Arctic grayling, northern pike, and various whitefish species were present in all lakes surveyed. Dolly Varden were noted in Two and Telequana lakes but not in Whitefish Lake. Sport angling occurs in Telequana and Two lakes, both by guided and unguided fishermen. Little information is available regarding sport fishing opportunities and species available in other lakes of the drainage. Most of the lakes in the upper drainage are shallow tundra lakes, unsuitable for supporting year-round resident fish populations. Big Lake near Sleetmute, and Tundra and Trout lakes near Lime Village on the Stony River support year-round fish populations because of their larger size.

#### **North Slope Brooks Range Sub-area**

The north slope of the Brooks Range sub-area (statewide harvest Area Z; Figures 16 and 17) includes all waters north of the Brooks Range divide flowing into the Beaufort and Chukchi Seas from Point Hope on the west to the Canadian border on the east including adjacent saltwater areas. Total land area in the sub-area is approximately 209,800 km<sup>2</sup>.

The northern-most part of Alaska is characterized by a broad Arctic coastal plain, which abuts the Arctic Ocean and Beaufort Sea, and by foothills and mountains which form the Brooks Range (Figure 17). The central and eastern Brooks Range consist of rugged, glaciated, east-trending ridges with summits rising to elevations of 4,350 to 5,000 m. The Delong Mountains on the western flank of the Brooks Range consist of glaciated ridges, 1,865 to 2,500 m in elevation, which drain northward into the Chukchi Sea. Only a few small lakes and no glaciers exist in the Delong Mountains although they were glaciated during the ice age. From the central and eastern Brooks Range, the mountain rivers flow northward to the Beaufort Sea. Although several large rock basin lakes lie at the mouths of glaciated valleys on both sides of the range, there are surprisingly few lakes for a glaciated area (Selkregg 1976). Most of the streams that cross the foothills flow northward from their sources in the range, but the region's largest stream, the Colville River flows eastward for more than 320 km before turning north onto the coastal plain (Figures 16 and 17). The drainage area of the Colville River is about 62,000 km<sup>2</sup>, a little more than half of the area drained by the Tanana River. Most streams east of the Colville River are braided and cross broad gravel flats that are often blocked in winter by aufeis (fields of ice that form continuously downstream from spring water sources) that cause local flooding (Selkregg 1976). The upper valleys of major rivers flowing from the Brooks Range often contain morainal lakes.

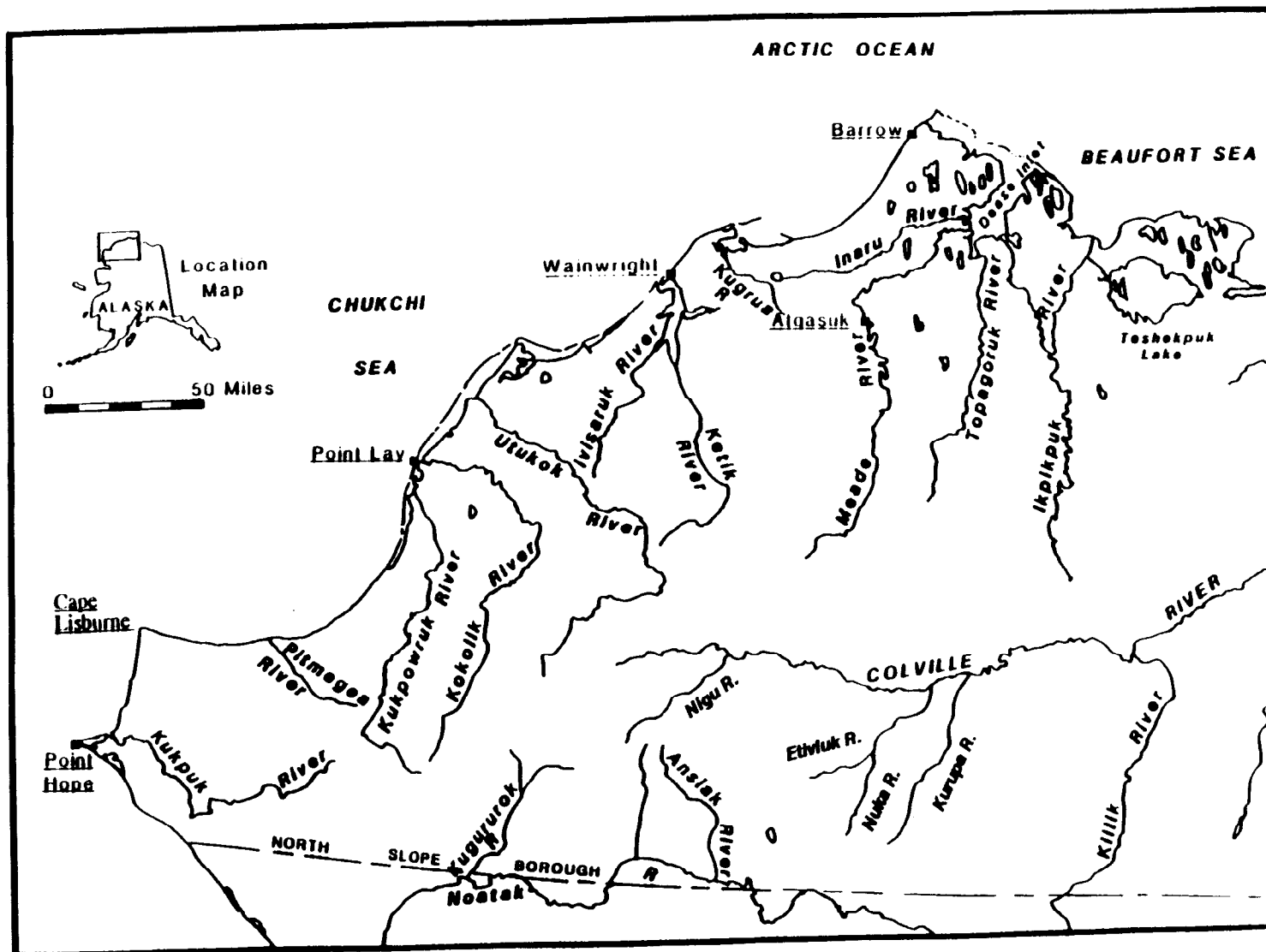


Figure 16.-Western portion of the North Slope.

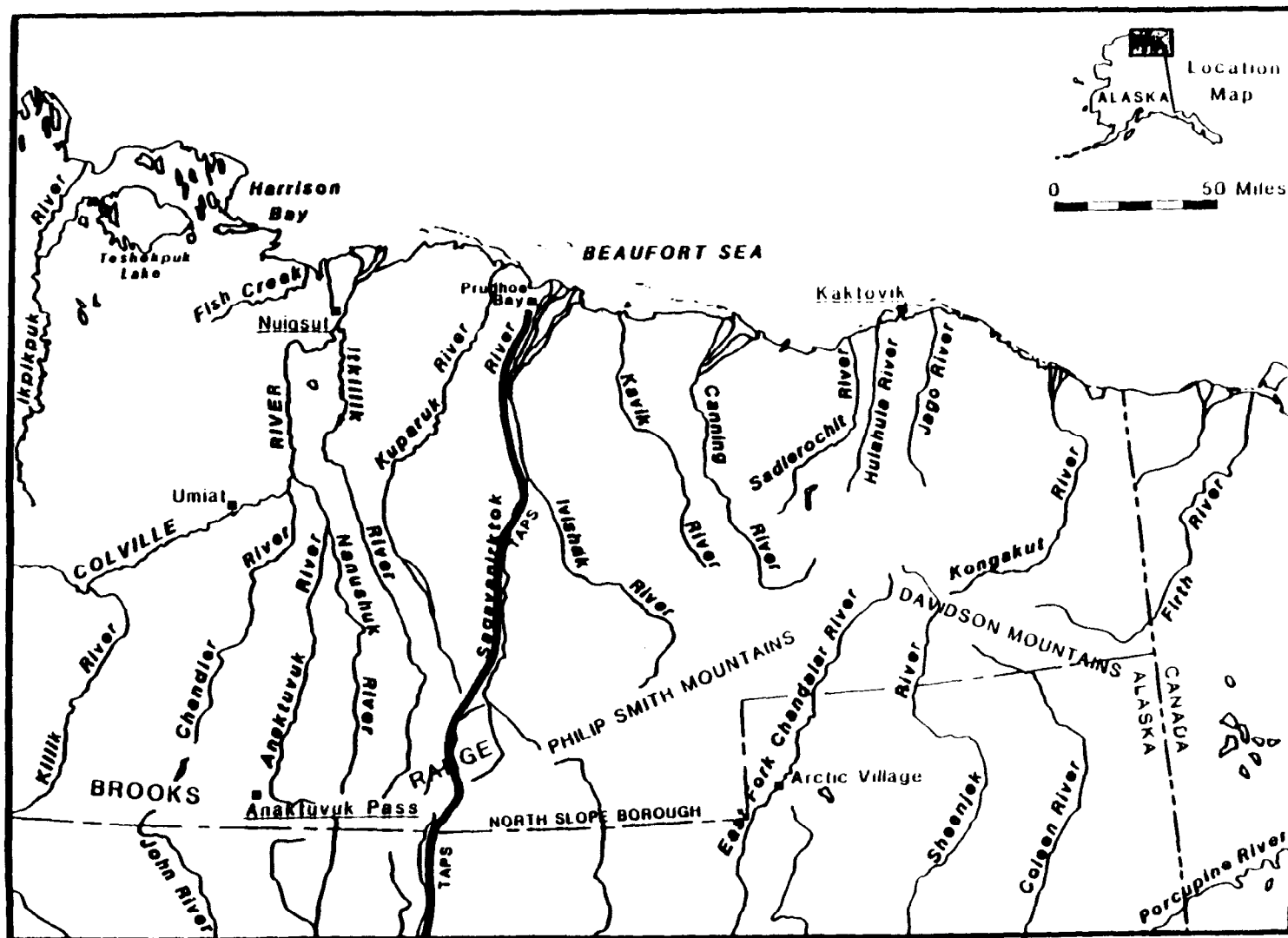


Figure 17.-Eastern portion of the North Slope.



The coastal plain is an area of low relief and poor drainage due to underlying permafrost and a shallow active layer, factors that lead to moisture entrapment near the surface. Rivers that cross the plain originate in the hills or mountains to the south. In the west, more than half of the plain is covered by oriented thaw lakes aligned to the north-northwest on their long axes. Ice-wedge polygons are found throughout the coastal plain section.

Major flowing waters of the coastal plain from west to east, include the Kukpowruk, Utukok, Kuk, Meade, and Itpikpuk rivers (Figure 16). The Colville River has several major tributaries, including the Killik, Chandler, Anaktuvuk, and Itkillik rivers. Streams east of the Colville River include the Kuparuk, Sagavanirktok, Canning, Hulahula, and Kongakut rivers (Figures 17 and 18).

The North Slope is accessible by air travel or from the Dalton Highway, which extends north from Livengood to Prudhoe Bay. The highway was originally built in 1974 to support construction of the Trans-Alaska oil pipeline. Sport fishing was closed for 8 km (5 miles) on either side of the pipeline beginning in 1978 to prevent rapid fisheries depletion by construction workers along the Trans-Alaska Pipeline. The closure was rescinded in 1980 when the Alaska Board of Fisheries (BOF) opened the Haul Road Corridor to fishing for all species except sheefish and salmon (Bendock 1980). Since June 1981, highway travel south of Disaster Creek (near Dietrich, Figure 11) has been open to the general public (Bendock 1982). The Alaska BOF opened the Haul Road Corridor for sheefish fishing in 1987, but salmon fishing remains closed.

The Dalton Highway crosses tributaries of the Sagavanirktok, Toolik, and Kuparuk rivers and parallels the Sagavanirktok River for about 160 km (100 miles) south of Prudhoe Bay, providing access to sport fishing opportunities for Arctic grayling, lake trout, Dolly Varden and Arctic char (Figure 11). There are numerous small lakes between Ribdon River (tributary to the Sagavanirktok River) and Galbraith Lake (Figure 11) that provide good fishing opportunities for these species.

Light sport fishing effort also takes place on the Colville, Kongakut, Canning, Ivishak, Echooka, Killik, Anaktuvuk and the Hulahula rivers (ADF&G 1986). Some fishing may also be done by parties floating the Nigu and Etivluk rivers (Bendock 1983). A significant proportion of the sport fishing in this sub-area is believed to take place by persons engaged in hunting activities as their main pursuit.

Lakes such as Toolik Lake in the upper Kuparuk River and Galbraith Lake in the upper Sagavanirktok River are two of the most frequently fished lakes north of Atigun Pass (Bendock and Burr 1984). Other popular lakes along the Haul Road include Island, Campsite, and Tea lakes. Lakes outside the Dalton Highway Corridor that receive sport fishing effort include Elusive, Shainin, Itkillik, Cascade, Kurupa, and Chandler lakes (Figures 11, 13, and 18; Furniss 1974; NPS 1985a).

### **Northwest Alaska Area Description**

The Northwest Alaska sport fish management area includes all waters north of the Yukon River drainage, in Norton Sound, the Seward Peninsula, Kotzebue Sound including the major drainages of the Kobuk and Noatak rivers, and the eastern Chukchi Sea to Point Hope. Total land area in the sub-area is approximately 173,500 km<sup>2</sup>.

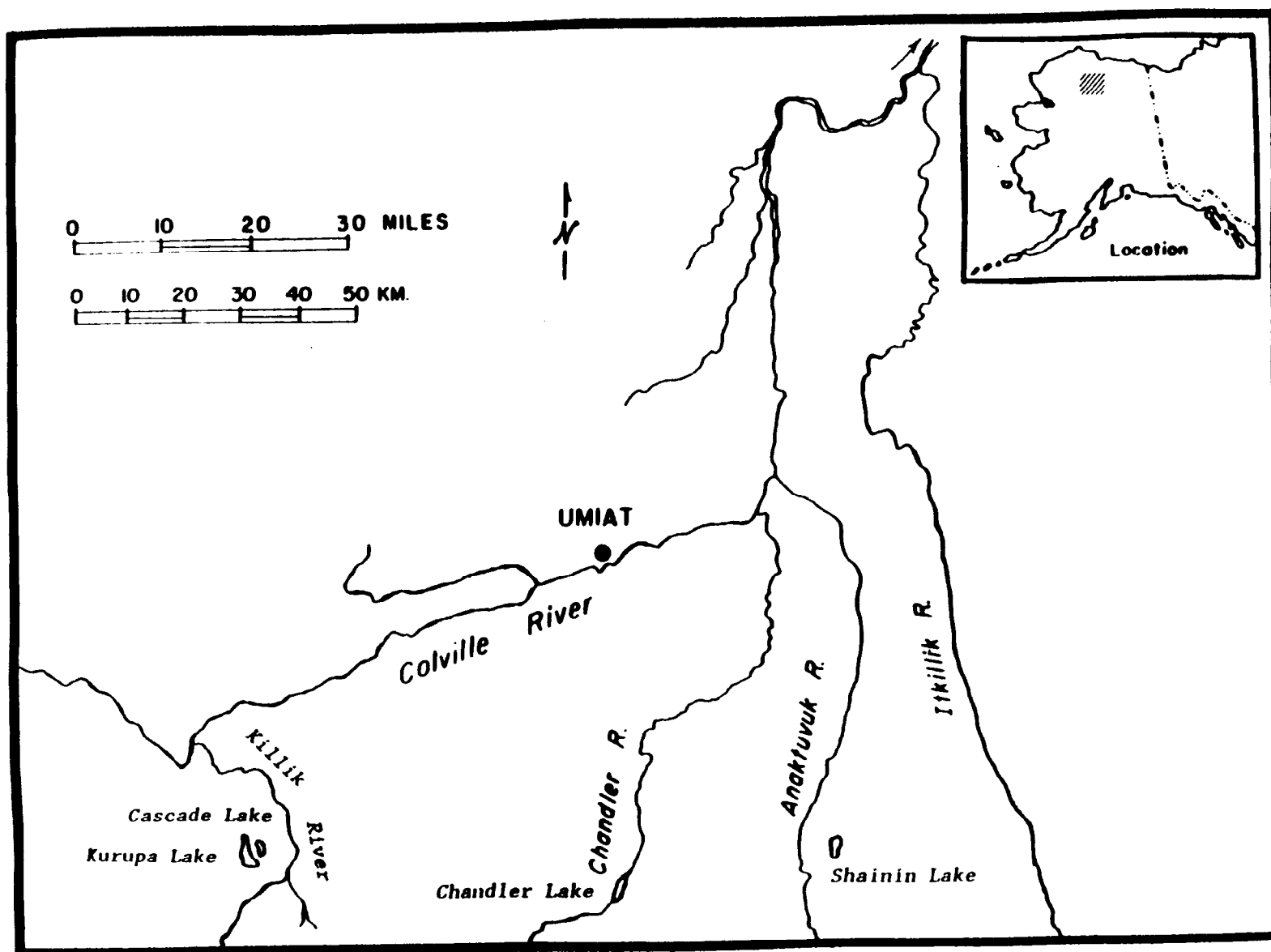


Figure 18.-Principal tributaries of the Colville River.

### **Seward Peninsula/Norton Sound Sub-area**

The Seward Peninsula-Norton Sound sub-area (statewide harvest Area W; Figure 1) includes all waters north of the Yukon River drainage and south of the Selawik River-Kotzebue Sound area and west of the Yukon-Koyukuk River drainages. This area includes Pastol Bay and all salt water north and west of it in Norton Sound as well as salt water adjacent to the Seward Peninsula, including Sparief Bay in Kotzebue Sound and the southern half of Eschscholtz Bay (ADF&G 1984).

Primary sport fishing streams in eastern Norton Sound (Figure 9) include several that drain the Nulato Hills which separate Norton Sound from the Yukon and Koyukuk River valleys. They include the Unalakleet, Shaktoolik, Inglutalik, and Ungalik rivers. The Unalakleet River is the largest and most heavily utilized of these, and it supports a sport fishery during summer months. A permanent lodge established on the lower Unalakleet River offers guide services to the Unalakleet River and to other streams in Norton Sound. The river and its tributaries support populations of Arctic grayling and Dolly Varden as well as chinook, coho, chum and pink salmon *Oncorhynchus gorbuscha*. Other area streams also support those species, but are not as intensively fished, primarily because of the limited access and facilities available to non-local fishermen. The Koyuk River carries an abundance of entrained material, including tannic stain, reducing water clarity. The stream terminates in Norton Bay at the extreme eastern corner of Norton Sound. It offers little potential for sport fishing except for northern pike and Arctic grayling and sheefish in some clear water tributaries.

Several high quality sport fishing streams are located along the southern half of the Seward Peninsula from Koyuk to Teller, (Figure 19) including the Tubutulik, Kwiniuk, Fish, Niukluk, Bonanza, Eldorado, Nome, Snake, Sinuk, Pilgrim, Agiapuk, and Kuzitrin rivers. Road access from Nome exists to many of these streams. Arctic grayling, Dolly Varden, and coho salmon occur in these streams, and chinook salmon, pink salmon, chum salmon, burbot or northern pike are found in many others. Small, perhaps remnant, sockeye salmon stocks are also present in the Pilgrim and Sinuk rivers. Trophy Arctic grayling, larger than 1.4 kg (3 lbs) are present in many streams on the Seward Peninsula, including the Sinuk, Nome, American, Tubutulik, Fish, Pilgrim and Kuzitrin rivers as well as others. Many of the largest Arctic grayling recorded as trophies for Alaska have been taken from streams on the Seward Peninsula. Of the 110 largest fish registered from 1967 to 1992 in the ADF&G trophy fish program, 30 were taken in waters of the Seward Peninsula. Twenty of the 30 registered trophy Arctic grayling from the Seward Peninsula were taken from the Sinuk River.

Most of the streams draining the northern half of the Seward Peninsula have low sport fishing potential due to relatively small flow volumes, difficult access, and poorer quality of water and fisheries habitat.

Most lakes on the Seward Peninsula were created either by thaw action in river floodplains or by glaciers in the mountains of the central and western Seward Peninsula. The largest inland body of water on the Seward Peninsula is Imuruk Lake (Figure 20) in the north-central portion of the peninsula. It is approximately 32 km<sup>2</sup> in area, and was probably formed when volcanic lava originating in the nearby area cut off drainage streams causing water to back up into a local depression. The lake presently drains northward through the Inmachuk River. Salmon spawn at the outlet in the fall and the lake supports whitefish and Dolly Varden.

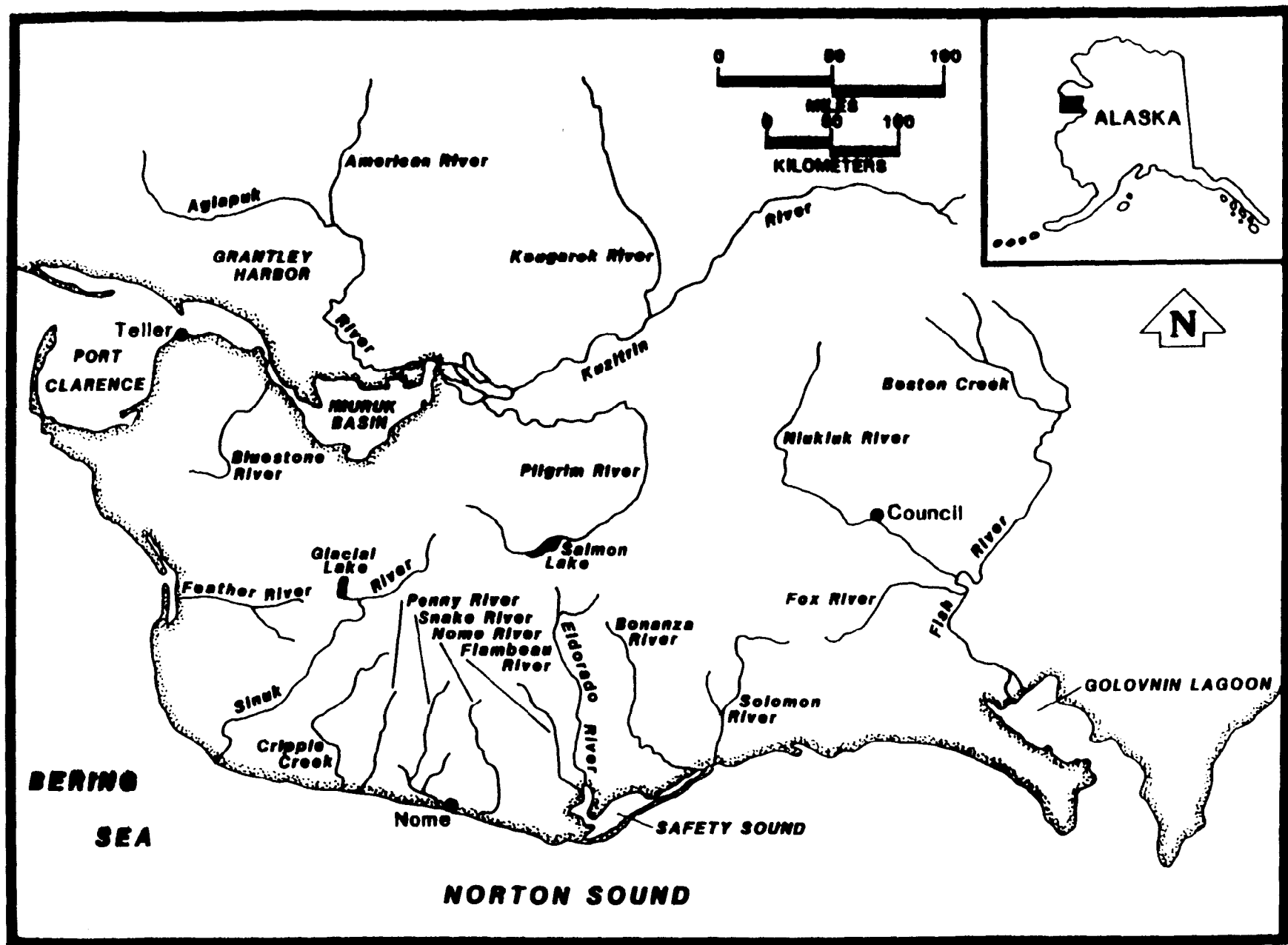


Figure 19.-Waters of the Seward Peninsula

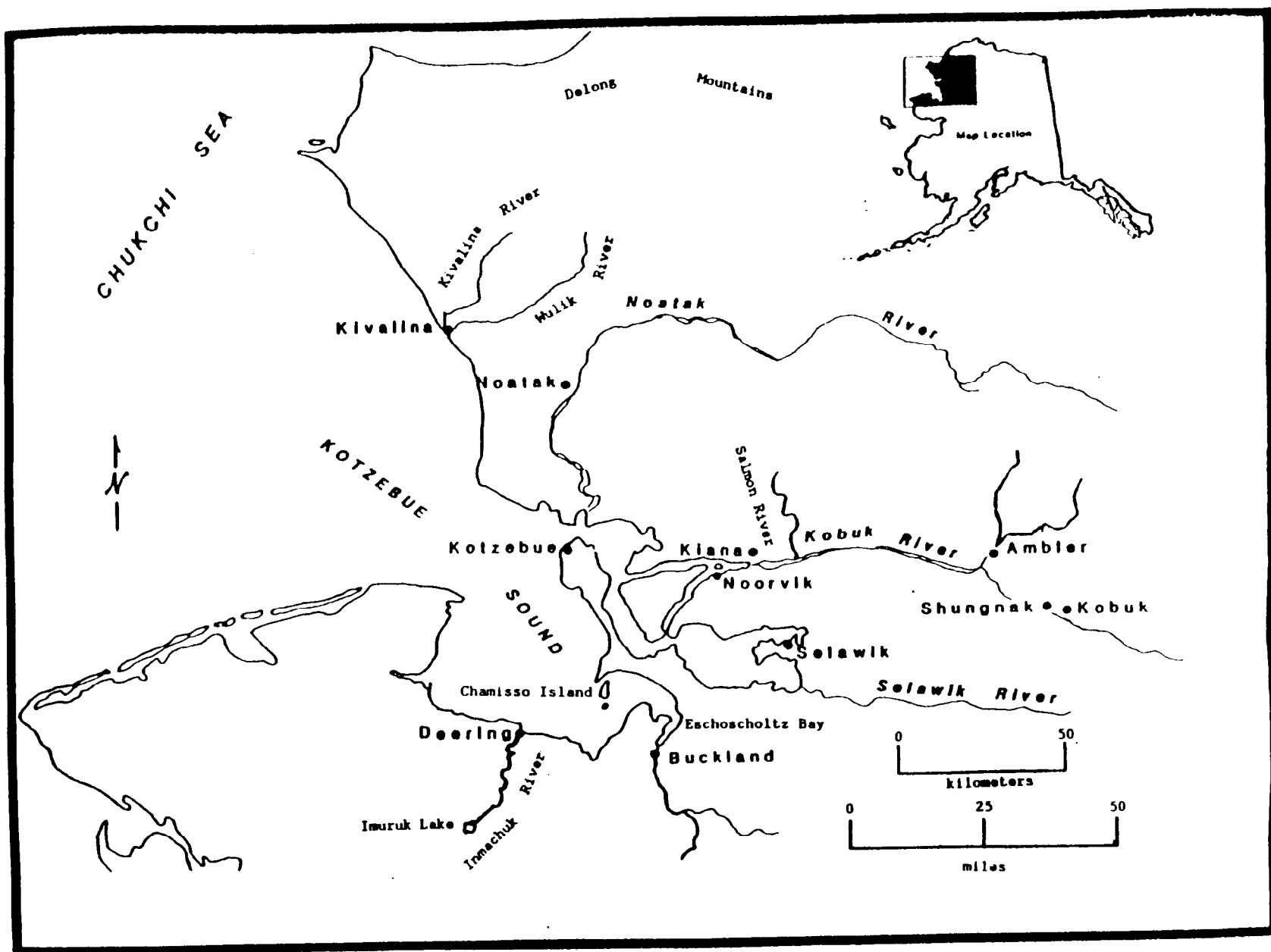


Figure 20.-Kotzebue Sound and surrounding area.

Smaller glacial lakes in the Imuruk Basin watershed and in the Kigluaik Mountains east of Nome contain populations of game fish. Some contain populations of lake resident Arctic char *Salvelinus alpinus*, (Kretsinger 1987) while other lakes and streams in this area contain anadromous Dolly Varden. Salmon Lake, located about 150 km northeast of Nome in the headwaters of the Pilgrim River, contains Dolly Varden, Arctic grayling, round whitefish, least cisco, burbot and a remnant stock of sockeye salmon (Figure 19). Since the lake can be reached by road from the town of Nome, it receives use for sport fishing, and during the first half of the century was an important recreation and fishing area for gold miners in the area. Subsistence fishing for salmon in Salmon Lake has been prohibited for many years because the stock was practically eliminated by early fisheries. Sport fishing for salmon in the lake and its tributaries is presently prohibited.

### **Kotzebue Sub-Area**

The Kotzebue Sub-Area (statewide harvest Area X; Figure 1) includes all waters and drainages of the Kotzebue area, including drainages of the Selawik, Kobuk, Noatak, Wulik, and Kivalina rivers. The area also includes all salt water in the northern half of Eschscholtz Bay, including the Chamisso Island area and the northern half of Kotzebue Sound to and including Point Hope (ADF&G 1984). The eastward limit of the sub-area extends to (but does not include) the Alatna River.

The most important streams of the Northwest Alaska sub-area (Figures 20, 21 and 22) are the Noatak and Kobuk rivers, both of which drain large areas of the southern slope of the western Brooks Range. Each has a drainage area of approximately 31,000 km<sup>2</sup> and stream length of from 560 km (Kobuk) to 640 km (Noatak; U.S. Army Corps of Engineers 1967). The third largest drainage is that of the Selawik River, with an approximate area of 11,700 km<sup>2</sup>. The Noatak River is slightly turbid at most times during the summer months from entrained glacial silt carried from mountain glaciers in the Brooks Range, while waters of the Kobuk and Selawik rivers are more clear. Abundant groundwater is present in both the Noatak and Kobuk rivers as water-bearing gravel aquifers on the lower main stem of the Noatak River and in tributaries of the Kobuk River. These aquifers tend to stabilize flows and water temperature fluctuations and provide water storage within the systems.

The Noatak River is a National Wild and Scenic River, and most of the drainage is included in the Noatak National Preserve (Figure 23). The extreme upper headwaters of both the Noatak and Kobuk rivers are included in the Gates of the Arctic National Park. A portion of the lower Kobuk Valley between Kiana and Ambler is included in the Kobuk National Park, and the Salmon River tributary, as well as the upper main stem of the Kobuk River are National Wild and Scenic Rivers as is the Selawik River. Much of the Selawik River valley is part of the Selawik National Preserve.

These three large river systems contain abundant fisheries resources. The Noatak River produces a large run of late chum salmon that are the primary species for the Kotzebue-based commercial fishery. Many thousands of anadromous Dolly Varden overwinter and spawn in the river, and during the commercial salmon fishery in August a significant incidental harvest of adult Dolly Varden is taken in gillnets. Whitefish, Arctic grayling, burbot and northern pike are resident in the Noatak River. Alt (1987) reports that sheefish use the river for feeding but do not spawn there.

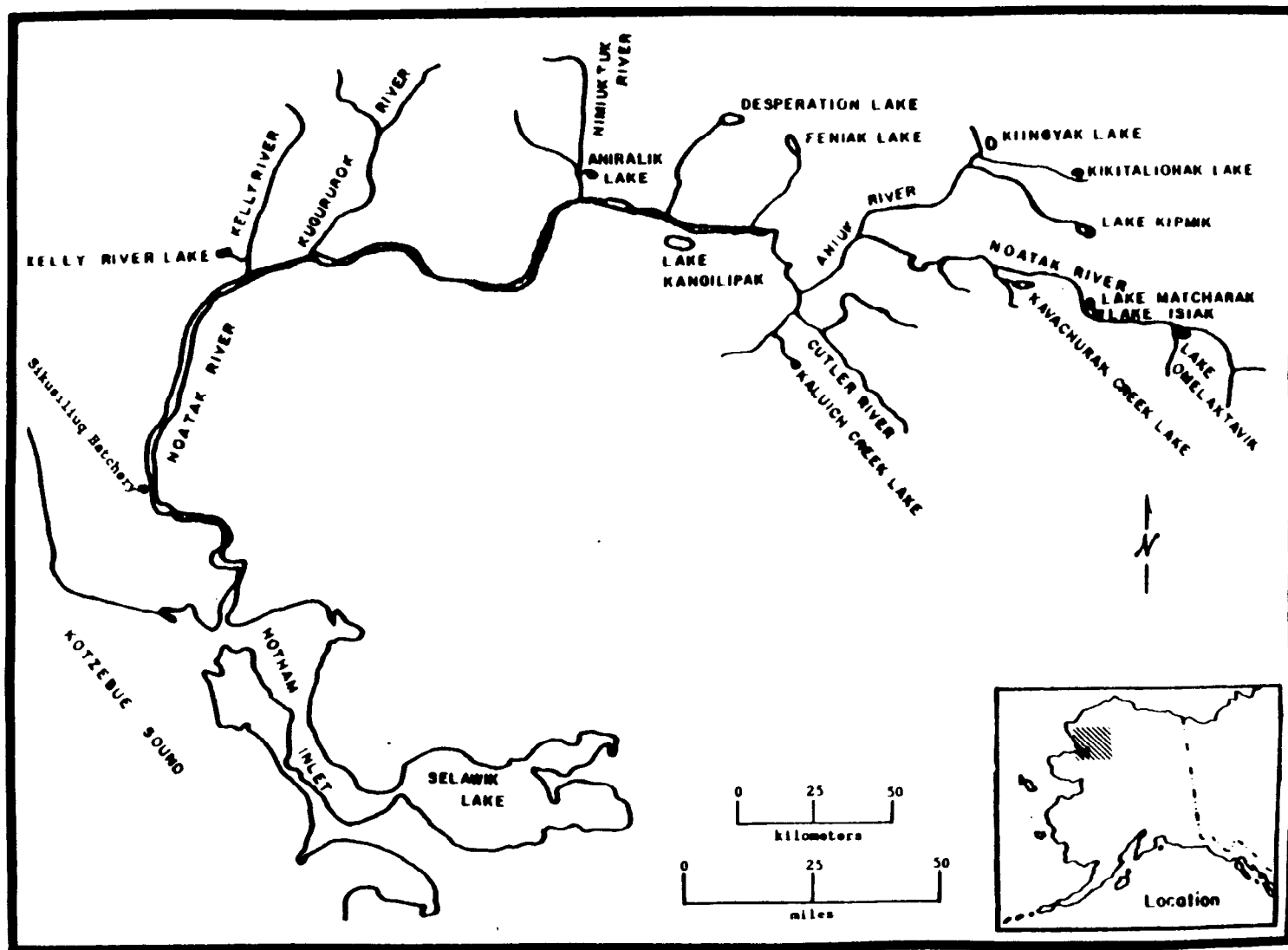


Figure 21.-Waters of the Noatak River.

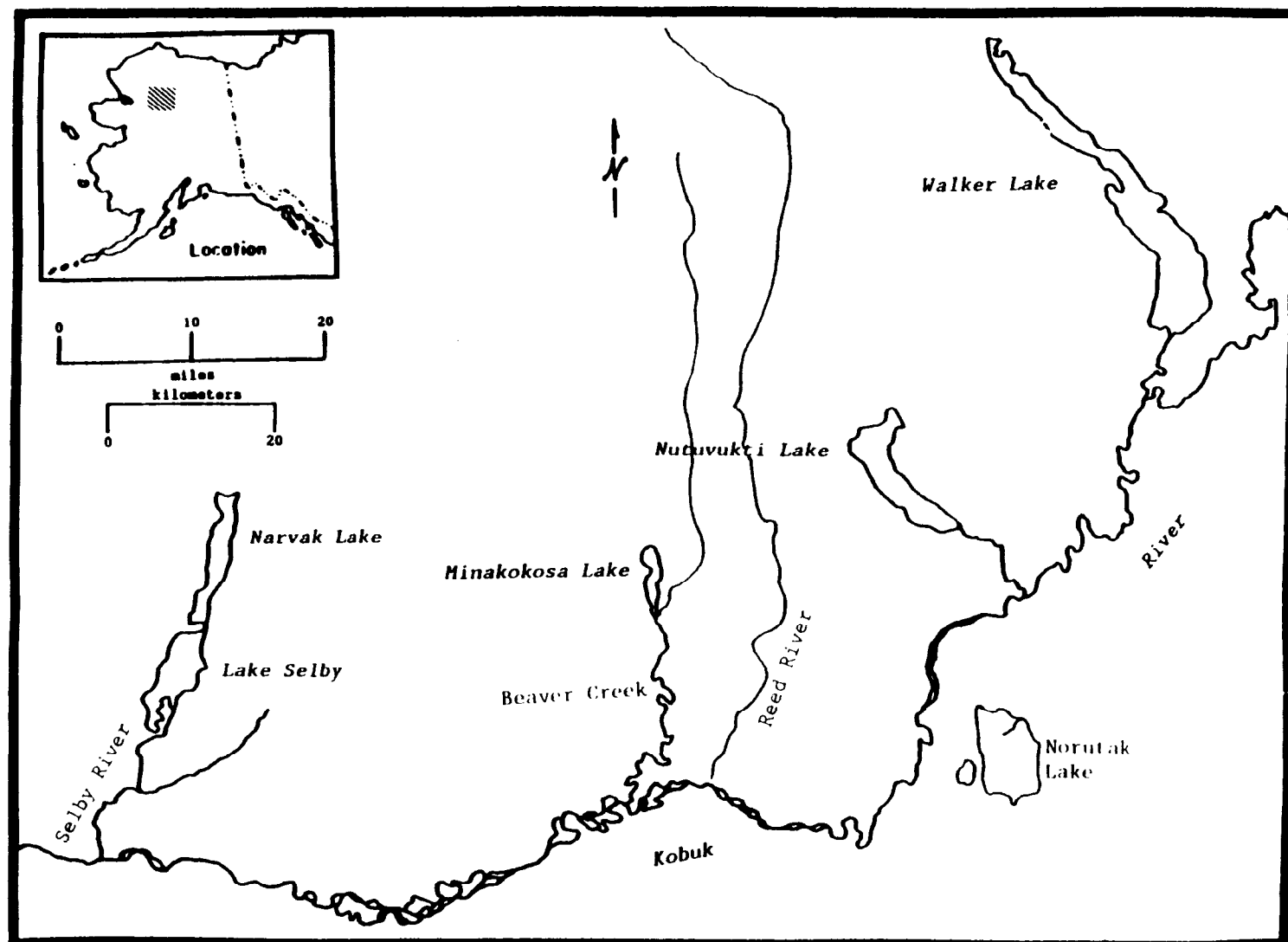


Figure 22.-Waters of the upper Kobuk River.



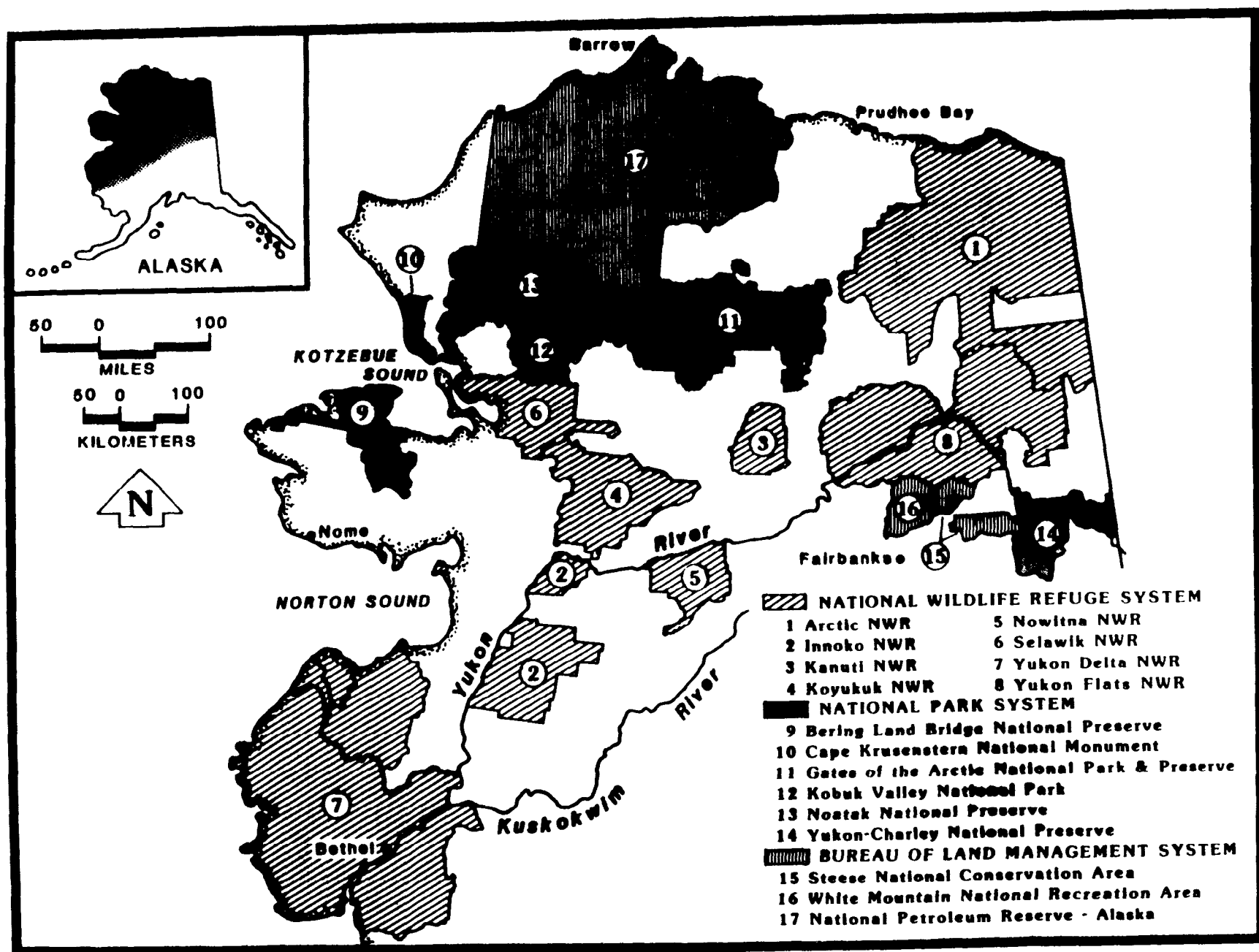


Figure 23.-Federal land designations within the A-Y-K region.

Both the Selawik and Kobuk rivers support spawning populations of sheefish in their upper main stems. The brackish delta systems which have formed at the river mouths serve as overwinter feeding areas for juvenile as well as adult sheefish. Trophy sheefish are taken from these waters especially in the upper Kobuk River during the fall when large mature spawners congregate near spawning areas in the main stem. The Alaska state record sheefish was taken in 1986 from the upper Kobuk River (mouth of the Pah River) and weighed 24 kg (53 lbs). Abundant whitefish utilize the rivers and delta areas, including Selawik Lake and Hotham Inlet (Kobuk Lake). Dolly Varden occur in some tributaries to the Kobuk River, as do northern pike in sloughs and connecting lakes to the lower river. Lake trout and Arctic char inhabit deeper lakes of the upper Kobuk River watershed. The Wulik and Kivalina rivers, which empty into the Chukchi Sea near the village of Kivalina, are well known as trophy streams for Dolly Varden.

Sport fishing effort in northwest Alaska is relatively light compared to most other areas in the state. Heaviest use occurs on the Noatak, Kobuk, and Wulik rivers. Many visitors to Gates of the Arctic National Park and Kobuk Valley National Park participate in float trips on the Kobuk River from Walker Lake to Kobuk village (Alt 1984; ADF&G 1986; National Park Service (NPS) 1984, 1985a). A lodge on Walker Lake promotes lake trout and Arctic char fishing. A small amount of shore fishing with hook and line for sheefish takes place near Kotzebue in the summer.

Guided and unguided anglers and river floaters use the Noatak River as do Kotzebue area residents who boat to different parts of the river to fish. The most popular fishing area is the Kelly River, but other tributaries such as the Nimiuktuk and Kuguruk rivers are also used occasionally for Dolly Varden fishing (Alt 1978).

Raft, canoe, and kayak trips are increasingly popular recreational uses on the Noatak River. Many parties put in at Matcharak Lake (Figure 21) and portage to the river, or land wheel aircraft on gravel bars farther upstream. Arctic grayling, Dolly Varden and lake trout are available in the upper Noatak River, and downstream from the Nimiuktuk River, chum salmon and northern pike also occur. Lake trout occur in Matcharak, Feniak, and Desperation lakes and in other lakes in the middle and upper Noatak drainage. Most lakes in the area are accessible only by floatplane during the summer.

The lower floodplains of the Kobuk and Selawik rivers, especially in the vicinity of the Kobuk River delta, and the lower Noatak River (upstream of the lower canyon of the Noatak) contain hundreds of shallow thaw lakes of various sizes. Fisheries resources in this area are poorly inventoried, but large populations of whitefish, northern pike, and sheefish are known to be seasonally present. Dolly Varden spawn in several Kobuk River tributary streams. The mountains in the upper Kobuk River drainage (Figure 22) contain several relatively large, deep lakes which were formed by glacial action. Lake trout, Arctic grayling, Arctic char and perhaps one or two whitefish species inhabit these lakes. They include Walker Lake, Nutuvukti Lake, Minakokosa Lake, Lake Selby and Narvak Lake.

Lakes of the upper Noatak River (Figure 21) were surveyed by Alt (1978), with a brief inventory of 13 lakes in the upper drainage. Fish were present in all lakes surveyed, and round whitefish lake trout and Arctic grayling were the most common species. Least cisco, northern pike, Dolly Varden, slimy sculpin *Cottus cognatus*, salmon (chum and sockeye), and ninespine stickleback *Pungitius pungitius* were also found.

## **ALASKA BOARD OF FISHERIES ACTIVITIES**

The process of developing appropriate fishing regulations continues each year both during the primary fishing seasons, as well as before and after. The following section describes the salient features of that process in 1992.

### **ALASKA BOARD OF FISHERIES**

The Alaska BOF met in Bethel from February 4 - 10, 1992 and considered thirteen proposed changes to sport fishing regulations that would have affected the Arctic-Yukon-Kuskokwim Region. Oral and written reports by staff of the Alaska Department of Fish and Game and written and oral testimony by members of the public and by representatives of several Advisory Committees were provided to the Alaska BOF during this meeting. The BOF adopted 12 of the thirteen proposed regulation changes in either original or amended form, and took no action on one proposed change (Andersen et al. 1992). A summary of proposals submitted for BOF action during the 1992 meeting is reproduced in Appendix B.

### **AYK SPORT FISHING REGULATIONS**

Published regulations for 1992 are reproduced as Appendix C.

### **ADVISORY COMMITTEES**

Public input concerning regulation changes is provided by several means, including direct testimony to the BOF and by participation in local fish and game advisory committees. Local advisory committees have been established throughout the state to assist the Boards of Fish and Game in assessing fisheries and wildlife issues and proposed regulation changes in the areas that will be affected. Most active committees meet at least once a year, usually in the fall prior to Board meetings. Staff from the Division of Sport Fish and other divisions are often invited to attend the committee meetings. In this way, the public is allowed opportunity for direct public interaction with Department staff involved with resource issues of local concern.

Several local advisory committees are active throughout the AYK Region : (1) in Western Alaska: Central Bering Sea, Lower Kuskokwim, Central Kuskokwim, Lower Yukon; (2) in Arctic Alaska: Norton Sound, Kotzebue, Northern Seward Peninsula, Upper Kobuk, Lower Kobuk, Noatak/Kivalina, Western Arctic, Eastern Arctic, St. Lawrence Island, Southern Norton Sound, and; (3) in Interior Alaska: Middle Nenana River, Delta, Eagle, Fairbanks, Lake Minchumina, Middle Yukon, Grayling/Anvik/Holy Cross, Koyukuk, McGrath, Ruby, Tanana/Rampart/Manley, Minto/Nenana, Upper Tanana/Forty Mile, and Yukon Flats.

Several of the committees did not meet to discuss fisheries issues in 1992. Sport Fisheries Division staff participated in meetings of the Fairbanks and Delta committees in 1992. Most fisheries issues in Nome, Kotzebue, and in the lower Yukon and Kuskokwim River areas were handled by Division of Commercial Fisheries staff attending those respective meetings.

### **FISHERY RESOURCE INVENTORY**

There are 17 fish species known in the Tanana area of which 11 are common sport species. They include: chinook salmon *Oncorhynchus tshawytscha*, coho salmon *Oncorhynchus kisutch*, chum salmon *Oncorhynchus keta*, Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, lake trout *Salvelinus namaycush*, inconnu (sheefish) *Stenodus leucichthys*, least cisco *Coregonus sardinella*, humpback whitefish *Coregonus pidschian*, and northern pike *Esox lucius*. Rainbow trout

*Oncorhynchus mykiss* are not native to the drainage, but have been stocked in several locations. Arctic char, coho salmon, Arctic grayling and lake trout have also been stocked in selected waters of the Tanana River drainage.

In addition to the species listed for the Tanana Area, wild stocks of Dolly Varden and Arctic char are important to sport fishing in many waters of the AYK Area. Wild stocks of rainbow trout occur as far upstream in the Kuskokwim River drainage as the Aniak River and its tributaries. Rainbow trout do not occur naturally in drainages north of the Kuskokwim River, although they have been stocked in two lakes of the AYK Area. Additional species of whitefish that are of importance to fisheries in the AYK Area include the broad whitefish, *Coregonus nasus*, Arctic cisco, *Coregonus autumnalis*, and Bering cisco, *Coregonus laurettae*. All other species listed under the Tanana Area are also found in the AYK Area. Marine species such as Pacific halibut *Hippoglossus stenolepis*, Pacific cod *Gadus macrocephalus*, saffron cod *Eleginus gracilus*, rainbow smelt *Osmerus mordax*, Dungeness crab *Cancer magister*, Tanner crab *Chionectes opilio*, King crab *Paralithodes camtschatica*, and others occur in coastal waters from Bristol Bay northwards, and are occasionally harvested by sport anglers.

Pink salmon are important to sport fishing in many waters of Norton Sound and the Seward Peninsula. Trophy sheefish are found in the Kobuk River, and trophy Dolly Varden are taken in the Noatak and Wulik Rivers. Alaska's highest quality sheefish and Dolly Varden fisheries, as measured by abundance and fish size, are in this area.

### **SPORT ANGLER EFFORT**

From 1982 through 1992, anglers in the AYK Region have expended an average of 193,676 angler-days, 10% of the total statewide effort (Table 1). The vast majority (average 80%) of sport effort in the region has occurred in the Tanana Regulatory area. This predominance reflects the higher human population density in the Tanana River Valley, rather than higher levels of fish abundance.

While estimates of effort in most of the sub-areas have remained more or less stable since 1982, effort levels in the Seward Peninsula and Norton Sound sub-area appear to have risen steadily during the eleven years of record (Table 1 and Appendix D). The fraction of statewide effort expended in the AYK Region has declined from over 12% in 1982 to approximately 7% in 1992. Effort increases in other regions as well as declining effort in the AYK Region would account for the decline. Most of the decline in effort in the AYK Region in 1992 is due to a drop in effort in the Tanana Area. Sport fishing effort by locations in AYK Region sub-areas for 1980 to 1992 is reproduced in Appendix D.

### **SPORT FISH HARVEST AND CATCH AND RELEASE**

Sport harvest of all species since 1977 in the Tanana Area reached an apparent peak in 1988 and 1989 when over 188,000 and 198,000 fish were harvested. Total harvest has declined since that time, with an estimated 85,000 fish harvested in 1992 (Table 2). The estimated harvest in 1992 was the lowest on record since 1977, and may reflect the unusually short, cool summer conditions prevailing that year. The mean annual harvest for the 16-year (1977-1992) period is 152,087 fish, and the 1992 estimated harvest is approximately 44% below the mean. Arctic grayling, stocked rainbow trout, stocked landlocked coho salmon, northern pike and whitefish have comprised the

**Table 1. –Sport angling effort<sup>a</sup> in waters of the Arctic-Yukon-Kuskokwim Region, 1982-1992.**

Arctic-Yukon-Kuskokwim Region														
	Tanana Area		A-Y-K Area						Northwest Alaska				Total	
	Tanana		Arctic		Yukon		Kuskokwim		Seward Pen		Kotzebue			
Year	Angler-Days	% <sup>b</sup>	Angler-Days	%	Angler-Days	%	Angler-Days	%	Angler-Days	%	Angler-Days	%	Angler-Days	%
1982	150,530	9.3	4,879	0.3	11,034	0.7	12,244	0.8	13,198	0.8	6,906	0.4	198,791	12.2
1983	144,981	8.4	5,738	0.3	11,070	0.6	12,429	0.7	16,944	1.0	7,963	0.5	199,125	11.5
1984	145,142	7.8	8,344	0.4	6,358	0.3	13,970	0.7	17,436	0.9	7,791	0.4	199,041	10.7
1985	135,745	7.0	4,490	0.2	8,670	0.4	11,358	0.6	19,919	1.0	6,701	0.3	186,883	9.6
1986	144,814	7.0	4,779	0.2	9,381	0.5	11,319	0.5	18,107	0.9	6,313	0.3	194,713	9.4
1987	155,346	7.2	5,256	0.2	7,017	0.3	17,856	0.8	21,413	1.0	10,221	0.5	217,109	10.1
1988	173,706	7.5	2,541	0.1	8,261	0.4	23,494	1.0	20,278	0.9	5,279	0.2	233,559	10.1
1989	185,715	8.2	4,118	0.2	10,712	0.5	16,457	0.7	17,692	0.8	4,932	0.2	239,626	10.6
1990	184,887	7.5	3,764	0.2	15,539	0.6	15,858	0.6	21,799	0.9	3,782	0.2	245,629	10.0
1991	155,662	6.3	7,291	0.3	10,749	0.4	13,055	0.5	23,622	1.0	9,543	0.4	219,922	9.0
1992	120,848	4.8	4,940	0.2	12,831	0.5	14,404	0.6	22,684	0.9	6,145	0.2	181,852	7.2
Average														
1982-92	154,307	7.4	5,104	0.2	10,147	0.5	14,768	0.7	19,372	0.9	6,870	0.3	193,676	10.0

<sup>a</sup> Measured as number of angler-days per year. One angler-day of effort equates to a single angler fishing for any portion of a day.

<sup>b</sup> Percentage of statewide effort.

**Table 2.—Tanana Area sport fish harvests by species, 1977-1992.**

		Salmon					Non-Salmon								
Year	Total	Chinook	Coho <sup>a</sup>	Coho <sup>b</sup>	Chum	Rainbow Trout	Lake Trout	Char <sup>c</sup>	Grayling	Northern Pike	Whitefish	Burbot	Sheefish	Other Fish	
1977	88,938	100	94	7,151	300	5,992	1,471	877	57,793	9,345	3,378	1,547	158	732	
1978	129,789	163	139	22,412	158	6,406	603	524	83,275	7,838	6,573	1,383	234	81	
1979	129,042	515	25	36,073	219	5,186	946	364	70,243	7,975	5,159	1,979	279	79	
1980	146,981	941	67	25,733	483	19,584	1,264	524	80,150	9,452	5,987	2,700	96	0	
1981	179,986	763	45	57,294	595	24,571	1,721	572	75,288	9,941	4,873	4,122	93	108	
1982	179,122	984	52	43,374	698	26,186	3,104	482	81,753	9,822	8,643	3,887	127	10	
1983	176,110	1,048	147	34,255	649	20,664	2,937	293	92,363	10,225	8,311	5,040	157	21	
1984	178,299	338	831	29,245	585	34,022	2,104	350	83,626	9,607	11,658	5,556	338	39	
1985	183,190	1,356	796	41,042	1,255	33,432	2,984	1,230	63,560	12,090	20,230	4,795	420	0	
1986	149,202	781	1,374	24,061	693	31,270	713	200	45,981	11,934	26,810	5,142	72	171	
1987	139,907	502	1,231	26,566	620	31,824	652	36	38,480	9,471	26,435	3,855	235	0	
1988	198,533	853	2,237	32,342	491	78,345	2,221	909	52,569	11,986	11,775	3,733	982	0	
1989	188,045	963	1,596	18,614	1,134	74,675	1,932	913	54,823	11,330	16,935	4,357	643	130	
1990	128,680	439	1,719	13,943	55	64,143	896	830	28,414	7,348	6,891	3,799	169	34	
1991	152,774	630	2,345	22,125	588	72,024	1,978	2,891	33,778	12,476	739	2,739	158	303	
1992	84,787	118	1,115	14,019	690	37,547	993	2,088	14,983	6,184	3,246	3,620	184	0	
Mean		656	863	28,016	576	35,367	1,595	818	59,817	9,814	10,478	3,641	272	107	
Percent	152,087	0.4	1.0	18.0	0.4	23.0	1.0	1.0	39.0	6.0	7.0	2.0	0.2	0.1	
Catch <sup>d</sup>															
1990	427,037	1,332	4,042	37,322	412	154,995	2,433	3,615	171,058	37,524	8,663	5,116	390	135	
1991	375,806	1,199	6,811	33,382	1,195	136,345	4,162	6,175	146,892	33,461	1,719	3,574	339	552	
1992	305,394	204	2,785	30,546	2,272	96,202	4,656	6,897	115,633	36,643	3,734	4,373	702	747	
Mean	369,412	912	4,546	33,750	1,293	129,181	3,750	5,562	144,528	35,876	4,705	4,354	477	478	
Percent		tr.	1.0	9.0	tr.	35.0	1.0	2.0	39.0	10.0	1.0	1.0	tr.	tr.	

<sup>a</sup> Anadromous salmon.<sup>b</sup> Landlocked coho and chinook salmon.<sup>c</sup> Includes Arctic char and Dolly Varden<sup>d</sup> Information available from 1990-1992 only. Anglers may have harvested or released fish tallied as "catch".

largest fraction of the sport harvest. Those species have accounted for approximately 93% of the mean annual harvest in the Tanana Area.

Sport harvest of all species in the AYK Area (combined sub-areas of Norton Sound/Seward Peninsula, Northwest Alaska, North Slope, Yukon River and Kuskokwim River) has averaged an estimated 59,872 fish since 1977 (Table 3). Peak harvests were recorded in 1982 and 1983 when more than 95,000 and 97,000 fish were harvested. Estimated harvest in 1992 of 47,698 fish represents about 80% of the mean annual harvest. Numerical percentages of harvests in the AYK Area have been dominated by Arctic grayling, Dolly Varden, pink salmon, northern pike and coho salmon. Those species have accounted for approximately 74% of the mean annual harvest in the AYK Area.

Sport catch estimates since 1990 are included in Tables 2 and 3. Numbers reported as catch include fish that are caught and kept (harvested) and those that are caught and released. On average, for the three years of record, a higher proportion (72%) of fish caught in the AYK Area are released than in the Tanana Area (59%). The proportion of catch and release varies by species, and burbot and whitefish for example, are more frequently caught and harvested than Arctic grayling and rainbow trout (Figure 24).

## **COMMERCIAL AND SUBSISTENCE FISH HARVESTS**

Important subsistence and commercial fisheries exist in the AYK Region, and form an economic base for income and employment in many local communities. Commercial and subsistence harvests for salmon, herring, halibut and crab are much larger than sport harvests for those species. Extremely limited commercial fisheries exist for freshwater species such as sheefish, burbot, northern pike and whitefish, so that the majority of the freshwater harvest is for subsistence and sport use. Personal use fisheries are also allowed, and account for a small proportion of the salmon harvests except in the Tanana Area and in the Yukon Area near the Dalton Highway bridge, where larger personal use harvests are taken.

Salmon harvests for subsistence and commercial use are relatively less important in the North Slope sub-area than in the other sub-areas of the AYK Region, mainly because salmon are only sparsely distributed north of Point Hope on the Chukchi Sea coast. Numerically, harvests are dominated by chum salmon in all sub-areas (Table 4). Coho salmon comprise a nearly equal harvest proportion with chum salmon in the Kuskokwim Area however. Chinook salmon, while less abundant, are the most important fish for commercial sale and for subsistence in many parts of the region. Sockeye salmon are taken commercially in the Kuskokwim Bay sub-area, especially in the Kuskokwim Bay subdistricts of Quinhagak and Goodnews Bay, but the species is almost absent north of the Kuskokwim River. Pink salmon occur throughout the AYK Region in streams near the coast, but, while numerically dominant in some years, the species is not exploited to a great extent in commercial or subsistence fisheries of the region. Returns of pink salmon to Norton Sound have been estimated in the tens of millions in some years. Pink salmon are important sport fish in Norton Sound.

Commercial catches have averaged some 3 million salmon annually of all species in the AYK Region from 1977-1992.

Table 3.-Arctic-Yukon-Kuskokwim Area<sup>a</sup> sport fish harvests by species, 1977-1992.

Year	Salmon							Non-Salmon										Other Fish	King Crab
	Total	Chinook	Coho <sup>b</sup>	Sockeye	Pink	Chum	Lake Trout	Rainbow Trout	Char <sup>c</sup>	Grayling	Northern Pike	Whitefish	Burbot	Sheefish	Smelt	Halibut			
Harvest																			
1977	23,343	202	879	69	2,524	276	798	223	2,410	9,375	2,014	776	226	1,089	0	0	2,482	0	
1978	36,248	932	1,308	85	8,328	1,834	497	362	4,014	11,289	3,915	909	506	1,057	0	0	1,212	0	
1979	45,015	644	2,958	126	2,918	1,482	655	401	8,144	19,229	4,004	855	118	1,263	0	0	2,218	0	
1980	59,569	939	3,469	112	7,844	2,290	1,025	835	8,273	20,396	6,190	1,705	663	2,315	0	0	3,513	0	
1981	52,343	1,112	2,087	117	3,118	3,045	1,100	982	8,176	20,892	5,184	576	684	2,146	0	0	3,124	0	
1982	95,419	1,530	5,909	430	14,214	5,083	2,023	796	13,647	27,043	7,435	3,708	1,896	3,154	0	0	8,551	0	
1983	97,976	2,649	5,785	261	5,286	4,049	1,157	1,783	20,324	30,800	8,609	4,746	555	3,166	0	0	8,806	0	
1984	66,784	1,481	11,205	650	8,712	2,689	1,520	1,455	12,882	15,516	4,610	234	377	3,609	0	0	1,844	0	
1985	57,919	1,331	2,396	169	1,206	1,781	2,370	659	13,430	17,666	3,613	630	420	2,100	8,750	62	1,336	0	
1986	67,624	2,079	7,319	439	3,404	3,643	2,537	504	10,173	19,744	7,062	4,960	469	3,649	464	0	1,178	0	
1987	61,770	1,691	7,210	1,364	1,322	2,148	461	592	12,333	19,476	4,751	724	162	2,362	7,080	36	0	0	
1988	65,838	2,965	9,713	1,528	3,859	3,201	509	1,599	11,238	16,302	7,838	1,855	145	2,239	2,476	0	371	0	
1989	66,075	2,450	8,655	456	3,765	4,748	1,955	757	13,359	17,215	5,853	1,997	537	1,663	2,424	0	241	0	
1990	45,383	1,366	4,819	818	7,994	2,091	847	435	7,431	9,092	4,982	810	1,684	581	1,709	144	580	0	
1991	68,953	1,333	8,317	631	1,865	2,570	774	1,055	16,880	18,576	8,295	2,197	316	2,098	1,818	0	1,480	748	
1992	47,698	1,571	7,255	378	8,434	2,303	1,198	404	5,374	7,321	5,154	607	633	2,749	2,001	33	1,136	1,147	
Mean	59,872	1,517	5,580	477	5,300	2,702	1,214	803	10,506	17,496	5,594	1,706	587	2,203	1,670	17	2,380	118	
Percent		3.0	9.0	1.0	9.0	5.0	2.0	1.0	18.0	29.0	9.0	3.0	1.0	4.0	3.0	tr.	4.0	tr.	
Catch <sup>d</sup>																			
1990	217,831	7,118	13,533	4,005	23,252	11,755	6,455	12,436	38,671	63,308	27,058	2,276	1,684	2,970	1,709	188	1,413	0	
1991	228,246	3,449	16,207	4,231	4,957	7,994	2,438	11,546	66,060	76,156	24,652	2,507	326	3,650	1,818	0	1,507	748	
1992	202,805	6,634	18,569	2,086	35,812	12,984	3,801	5,540	36,889	44,210	24,087	993	674	5,885	2,001	33	1,298	1,309	
Mean	216,294	5,734	16,103	3,441	21,340	10,911	4,231	9,841	47,207	61,225	25,266	1,925	895	4,168	1,843	74	1,406	686	
Percent		3.0	7.0	2.0	10.0	5.0	2.0	5.0	22.0	28.0	12.0	1.0	tr.	2.0	1.0	tr.	1.0	tr.	

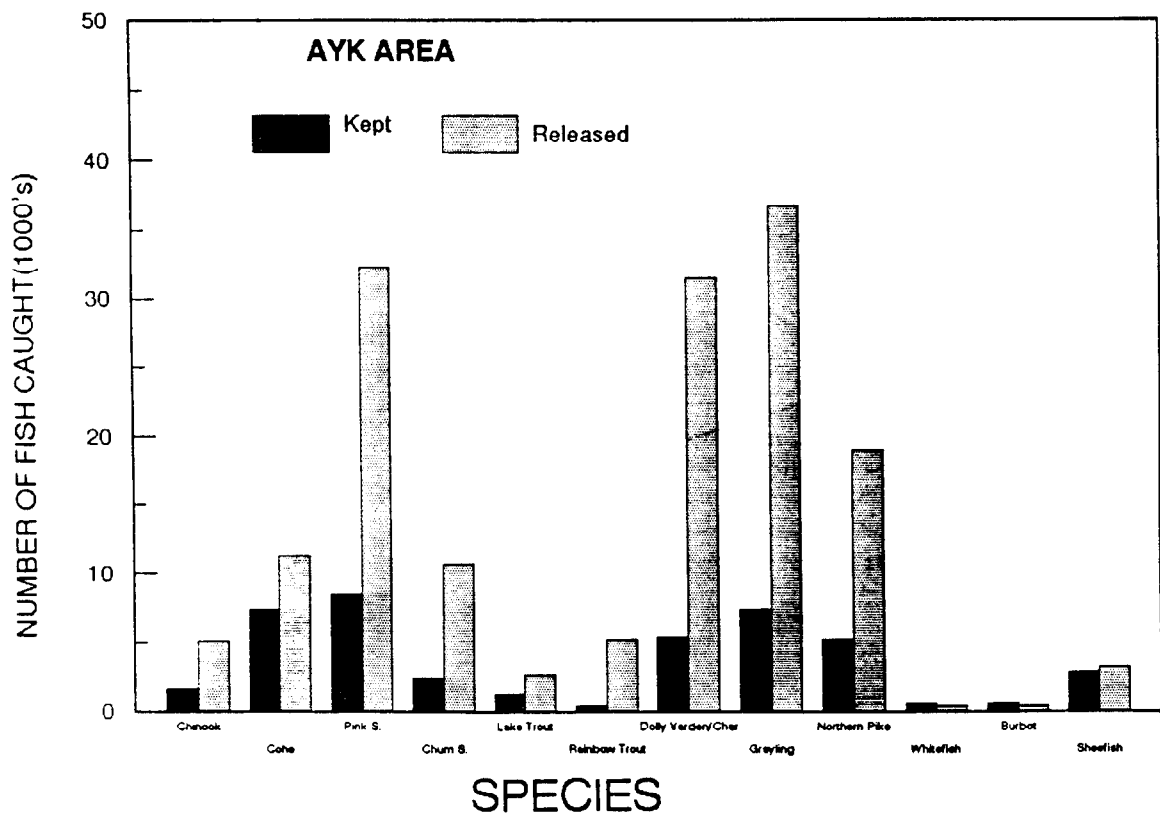
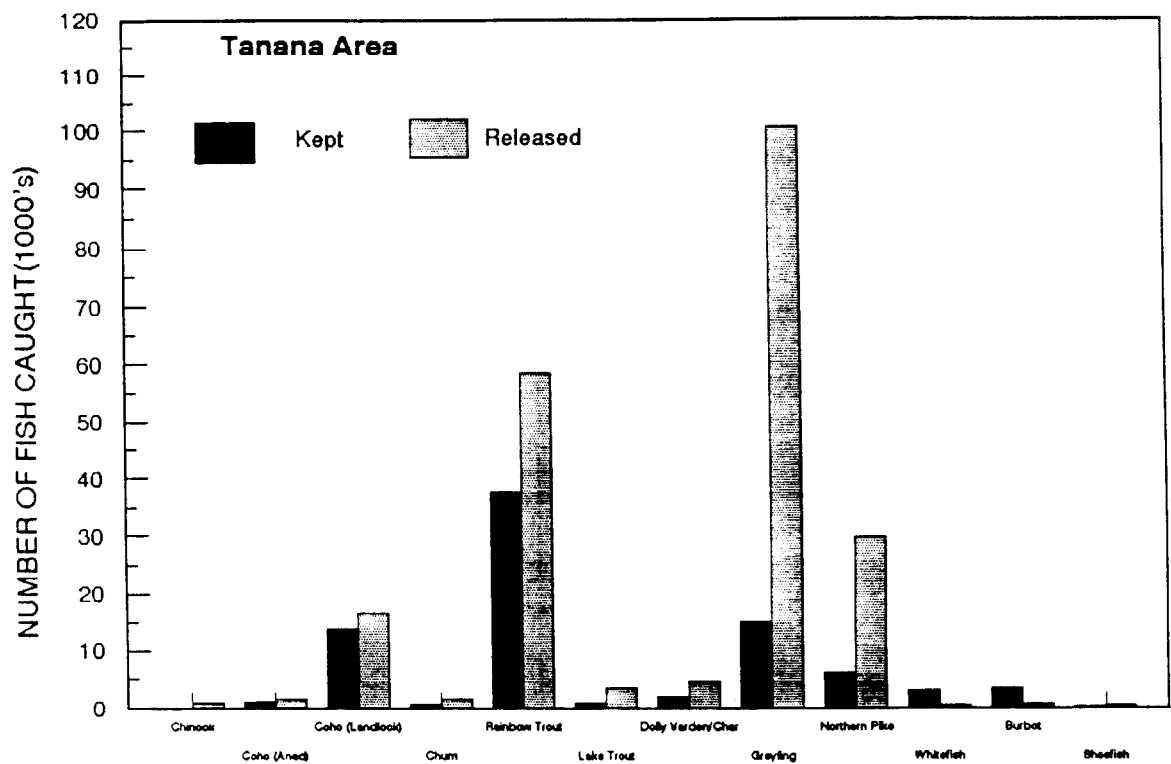
<sup>a</sup> Includes sub-areas Norton Sound/Seward Peninsula, Northwest, North Slope, Yukon River, and Upper Kuskokwim River

<sup>b</sup> Includes only anadromous salmon.

<sup>c</sup> Includes Arctic char and Dolly Varden.

<sup>d</sup> Information available from 1990-1992 only. Anglers may have harvested or released fish tallied as "catch".





**Figure 24.-Catch and release data, 1992.**

**Table 4.-Commercial harvest (thousands of fish) of salmon in the AYK Region, 1977 - 1992.**

Year	AREA					Grand Total
	Tanana River	Yukon River <sup>a</sup>	Kuskokwim River <sup>b</sup>	Norton Sound	Northwest Alaska	
<b>Chinook Salmon Harvest:</b>						
1977	1,008	95,749	58,256	4,500	tr.	159,513
1978	635	95,533	63,194	9,819	tr.	169,181
1979	772	126,901	53,314	10,706	tr.	191,693
1980	1,947	152,038	48,242	6,311	tr.	208,538
1981	987	157,031	79,378	7,929	tr.	245,325
1982	981	122,663	79,816	5,892	tr.	209,352
1983	911	146,999	93,676	10,308	tr.	251,894
1984	867	119,037	74,006	8,455	tr.	202,365
1985	1,142	145,046	74,083	19,491	tr.	239,762
1986	950	99,020	44,972	6,395	tr.	151,337
1987	3,338	131,422	65,558	7,080	tr.	207,398
1988	762	100,659	74,552	4,096	tr.	180,069
1989	1,741	100,099	67,003	5,707	tr.	174,550
1990	2,156	93,618	84,706	8,895	tr.	189,375
1991	1,072	105,344	48,170	6,068	tr.	160,654
1992	752	120,419	67,597	4,541	tr.	193,309
Mean	1,251	119,474	67,283	7,887		195,895
Percent	1.0%	61.0%	34.0%	4.0%		
<b>Chum Salmon Harvest:</b>						
1977	22,990	769,901	298,959	257,325	195,895	1,545,070
1978	59,996	1,271,320	282,044	531,948	111,533	2,256,841
1979	63,737	1,134,208	297,167	350,401	141,623	1,987,136
1980	58,657	1,305,508	561,483	444,337	367,284	2,737,269
1981	63,472	1,693,965	485,635	441,734	677,239	3,362,045
1982	30,530	911,475	325,471	511,208	417,790	2,196,474
1983	61,517	1,241,614	306,554	456,420	175,762	2,241,867
1984	77,204	999,396	488,482	342,159	320,206	2,227,447
1985	10,805	1,093,477	224,680	180,200	521,406	2,130,568
1986	54,703	1,274,166	349,268	230,400	261,436	2,169,973
1987	11,060	611,481	603,274	136,283	109,467	1,471,565
1988	65,425	1,692,046	1,443,916	225,132	352,915	3,779,434
1989	03,429	1,638,443	802,199	92,811	254,617	2,891,499
1990	65,762	586,128	522,535	131,665	163,263	1,469,353
1991	68,341	840,886	501,692	156,789	239,923	1,807,631
1992	26,250	529,987	436,506	83,394	289,184	1,365,321
Mean	58,992	1,099,625	495,617	285,763	287,471	2,227,468
Percent	3.0%	49.0%	22.0%	13.0%	13.0%	

-continued-

**Table 4.-Page 2 of 2.**

Year	AREA					Grand Total
	Tanana River	Yukon River <sup>a</sup>	Kuskokwim River <sup>b</sup>	Norton Sound	Northwest Alaska	
Coho Salmon Harvest:						
1977	1,284	37,579	263,728	3,690	NR	306,281
1978	3,066	23,086	247,271	7,335	NR	280,758
1979	2,791	14,374	208,683	31,438	NR	357,286
1980	1,226	2,519	327,908	29,842	NR	361,495
1981	2,284	21,396	278,587	31,562	NR	333,829
1982	7,780	29,396	567,451	91,690	NR	696,317
1983	6,168	7,132	249,018	49,735	NR	312,053
1984	7,688	74,252	829,965	67,875	NR	979,780
1985	11,762	45,910	382,096	21,968	NR	461,736
1986	441	46,814	736,910	35,600	NR	819,765
1987	0	0	478,594	24,279	NR	502,873
1988	13,972	72,640	623,719	37,214	NR	747,545
1989	16,084	67,269	556,312	44,091	NR	683,756
1990	14,804	27,890	445,062	56,712	NR	544,468
1991	9,774	93,406	556,818	63,647	NR	723,645
1992	7,979	0	772,449	105,418	NR	885,846
Mean	6,694	35,229	476,536	43,881		562,340
Percent	1.0%	6.0%	85.0%	8.0%		

<sup>a</sup> Yukon River in Alaska, exclusive of Tanana River

<sup>b</sup> Kuskokwim River and Kuskokwim Bay.

NR = no harvest or catch reported.

tr = trace; very low reported harvest.

## **ECONOMIC VALUE OF SPORT FISHERIES**

Economic value of sport fishing can only be crudely estimated by comparison with past studies conducted in different areas of the state. The most pertinent study (Jones and Stokes 1987) directly estimated economic values in 1986 of sport fisheries in the Southcentral Region of the state. In that study, it was reported that non-resident anglers spent approximately \$250.00 per day of fishing, while resident anglers spent approximately \$65.00 per day. It is estimated by Mills (1993) that resident anglers spent 156,924 angler-days of effort in 1992 in the AYK Region, while non-residents spent 24,928 angler-days. By simply using these estimates of cost per angler-day and effort, economic value of AYK Region sport fisheries in 1992 was approximately 16 million dollars.

## **STOCKING PROGRAM INVENTORY**

Selected waters (lakes, ponds and Piledriver Slough) of the Tanana River drainage are stocked on a continuing basis with rainbow trout, coho salmon, Arctic grayling, chinook salmon, lake trout, sockeye salmon, and Arctic char. Resulting fisheries composed a minimum of 45% of the sport angling effort and 63% of the fish harvested in the Tanana River drainage in 1992. Objectives of the fish stocking program in the Tanana River drainage are:

1. reduce harvest pressure on some wild stocks;
2. provide angling opportunity for increasing numbers of anglers;
3. diversify angling opportunity; and,
4. rehabilitate depleted wild stocks.

Lake stocking in the Tanana River valley takes place over an approximate 130,000 km<sup>2</sup> area, mostly near communities and along the road system, but also in a number of remote locations accessible only by off-road vehicle (ORV), dog team, or airplane. About half of the yearly sport effort on stocked lakes takes place during the winter on larger accessible lakes.

The ADF&G stocking in the Interior began in the mid-1950's when barren lakes along the road system were stocked with rainbow trout or salmon. Between 1968 and the early 1980's, 15 lakes (including Birch and Quartz lakes) were chemically treated to eradicate endemic fish populations (Doxey 1987).

Throughout the 1970's, hatchery ability to provide stocked fingerlings steadily increased as fisheries enhancement received growing emphasis. Native Alaska rainbow trout brood stocks were developed when the importation of eggs from outside the state was discontinued in the late 1970's. As suitable brood stocks were developed and new hatcheries came on line, numbers of available stocked fish increased so that by 1985, average annual harvest and effort levels for stocked waters had risen by more than 40% and 20%, respectively (Doxey 1987).

The growth and success of the interior Alaska stocking program has been largely due to the development of, and production from, Alaska state hatcheries, particularly the Clear Hatchery, located about 145 km south of Fairbanks at the Clear Air Force Station (Figure 8) and the Fort Richardson hatchery near Anchorage. The Clear Hatchery program began in 1977, with an initial mission to experimentally incubate, rear and release chum salmon to determine whether large scale enhancement of salmon would be feasible under conditions found in interior Alaska. In recent years, production of sport fish species has taken precedence over anadromous salmonids,

and a large proportion of its output consists of fingerling and sub-catchable rainbow trout, coho salmon, and Arctic grayling. The facility presently has a capacity of about 9.0 million eggs.

Success of the stocking program is evaluated annually. The level of evaluation varies according to the size and accessibility of the lake and the importance and intensity of the sport fishery. Minimal evaluations address the question of whether the stocked fish survived and are providing sport fishing. More comprehensive evaluations provide limnological data, growth rate data, and fishery statistics such as CPUE, population estimates, comparison of performance between species, and other parameters.

The stocking program took on a new dimension in 1992 when a rehabilitation program for Arctic grayling in the Chena River was initiated. The rehabilitation program includes regulatory actions designed to promote stock conservation as well as releases of hatchery and pond-raised Arctic grayling to supplement natural production. Proposed rehabilitation will last three years, after which, fishery managers will enact fishing regulations to ensure sustained yield of the stock. The first lot of fertilized eggs was taken from the Chena River stock for use in supplementing natural production in May 1992.

## **1992 STOCKING RESULTS**

Approximately 2.534 million fish of four species were stocked in different locations in 1992, of which 601,418 were rainbow trout. Similar numbers of fish were stocked in 1990 and 1991.

Most of the stocked rainbow trout in 1992 were fingerling (approximately 1.0 to 2.0 g) or of catchable size (65 to 680 g). Sub-catchable (20 to 30 g) sized fish totaled fewer than the catchable size releases in 1992. All rainbow trout released in 1992 were reared at the Fort Richardson Hatchery in Anchorage (Table 5), and were of the Swanson River (Kenai Peninsula) strain. Stocking events occurred in 46 different sites, all landlocked waters with the exception of Piledriver Slough. Piledriver Slough, Quartz, Harding and Birch lakes all received major plants of fish.

Approximately 1.5 million Arctic grayling were stocked in 1992, 1.2 million of which were fry size (less than 1.0 g). Fish were released in 25 separate locations in the Tanana River drainage. Harding, Birch, and Bolio lakes received major stockings (Table 6).

Arctic char of Aleknegik Lake brood source were stocked into 22 locations, including 315,925 fish from 9g to 64g released into Harding Lake in 12 different stocking events. A total of 394,641 Arctic char were released in 1992 (Table 7).

Coho salmon of Wood Creek brood source (Nenana River drainage) were released in 5 locations at a size of from 2.5g to 15.0g. A total of 37,982 were stocked in 1992 (Table 6).

## **RESEARCH AND MANAGEMENT ACTIVITIES**

Organization of the region staff is outlined in Figure 25. All activities were directed by the Regional Supervisor (J. Clark) who delegated appropriate tasks to the Administrative Assistant (E. Nielsen), the Research Supervisor (P. Merritt), the management supervisor (F. Andersen) and the following Fishery Biologist III's: W. Arvey, J. Hallberg, F. Parker, F. DeCicco, and C. Skaugstad. Lake stocking activities were the responsibility of M. Doxey. Area management responsibility and emergency order authority was vested with four positions, W. Arvey (AYK Area), J. Hallberg (Lower Tanana Area), F. Parker (Upper Tanana Area), and F. DeCicco

**Table 5.-Number and size of rainbow trout stocked in AYK Region waters in 1992.**

Receiving Water	Number Stocked	Release Date	Size (g)
Backdown Lake`	1,200	7/16	1.6
Bathing Beauty Pond	180	6/30	900.0
Bathing Beauty Pond	689	6/25	115.0
Bathing Beauty Pond	700	6/4	106.0
Bathing Beauty pond	971	6/30	102.0
Big D Pond	100	6/25	91.0
Birch Lake	24,494	6/10	30.0
Chena Lake	9,424	6/17	123.0
Chena Lake	600	6/25	91.0
Chena Lake	10,367	6/10	30.0
Chena Hot Springs Rd. #30.9	600	7/21	1.2
Chena Hot Springs Rd #45.5	1,600	7/21	1.2
Chena Hot Springs Rd #47.9	1,200	7/21	1.2
Coal Mine #5	2,600	7/16	1.6
Duck Pond #1	100	6/4	100.0
Duck Pond #2	100	6/4	100.0
Fun Fish Day, ADF&G Fairbanks	10	6/4	700.0
Fun Fish Day, ADF&G Fairbanks	500	6/4	106.0
Grayling Lake	1,095	6/25	127.0
Harding Lake	19,517	6/19	100.0
Hidden Lake (EAFB)	900	6/25	115.0
Johnson Pit #1	2,800	7/22	1.1
Ken's Pond	1,000	7/16	1.6
Les's Lake	800	7/21	1.2
L. Harding Lake	11,000	7/22	1.1
Last Lake	1,000	7/16	1.6
Lost Lake	4,806	6/19	100.0
Manchu Lake	8,600	7/22	1.1
Moose Lake	1,279	6/25	127.0
North Pole Pond	300	6/4	106.0
N. Twin Lake	4,000	7/16	1.6
Outboard Pit	1,543	6/25	127.0
Olnes Pond	1,600	7/21	1.2
Piledriver Slough	1,187	6/11, 6/30	900.0

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**Table 5.-Page 2 of 2.**

Receiving Water	Number Stocked	Release Date	Size (g)
Piledriver Slough	10,058	7/9	114.0
Piledriver Slough	18,695	6/30	102.0
Piledriver Slough	10,427	6/2	87.0
Quartz Lake	25,967	6/10	30.0
Quartz Lake	75,046	7/22	1.2
Quartz Lake	325,563	7/16	1.6
Richardson Pond Mil. 28	1,600	7/22	1.1
Sansing Lake	1,000	7/21	1.2
Shaw Pond	300	6/25	91.0
S. Twin Lake	4,000	7/16	1.6
Steese Hwy 29.5	1,800	7/21	1.2
Steese Hwy 30.6	500	7/21	1.2
Steese Hwy 31.6	800	7/21	1.2
Steese Hwy 33.0	1,400	7/21	1.2
Steese Hwy 33.5	600	7/21	1.2
Steese Hwy 34.6	1,200	7/21	1.2
Steese Hwy 35.8	500	7/21	1.2
Steese Hwy 36.6	1,800	7/21	1.2
Steese Hwy 39.2	1,000	7/21	1.2
Wainwright #6	300	6/4	106.0
Weasel Lake	1,600	7/16	1.6
Weigh Station #1	200	6/4	106.0
Weight Station #2	200	6/4	106.0
<b>Total rainbow trout</b>	<b>601,418</b>		

**Table 6.-Number and size of Arctic grayling and coho salmon stocked in AYK Region waters in 1992.**

Receiving Water	Number Stocked	Release Date	Size (g)
<b>Arctic grayling</b>			
Bathing Beauty Pond	550	6/4	115.00
Big lake (Delta)	1,000	9/21	3.70
Birch Lake	20,000	9/18	4.00
Birch Lake	23,936	9/22	3.90
Birch Lake	3,525	9/25	3.90
Birch Lake	318,000	6/17	0.02
Bolio Lake	5,500	9/21	3.70
Bolio Lake	79,663	8/12	1.10
Bolio Lake	276,000	6/16	0.02
Brodie Lake	1,000	9/21	3.70
Chena Lake	15,000	9/20	3.60
Chena HS #32.9	1,200	9/20	3.60
Chena River <sup>a</sup>	23,199	9/11	2.70
Dune Lake	18,000	8/31	2.40
Fun Fish Day (ADF&G Fairbanks)	50	6/6	273.00
Floline Pit	30,000	6/22	0.02
Hanger Pit	2,600	9/19	3.60
Harding Lake	400,000	6/19	0.02
Harding Lake	204,263	6/24	0.02
Long Pond (Nenana)	400	9/25	3.90
Luke Lake	16,000	6/22	0.02
Nickel Lake	1,000	9/21	3.70
North Pole Pond	236	6/15	115.00
North Pole Pond	166	6/25	300.00
Otto lake	20,000	9/19	3.60
Paul's Pond	1,000	9/21	3.70
Rangeview Lake	800	9/21	3.70
Rich 81	600	9/21	3.70
Round Pond	700	9/25	3.90
Wainwright #6	160	6/25	100.00
Weigh Station #1	200	6/4	115.00
Weigh Station #2	200	6/15	100.00
<b>Total Arctic grayling</b>	<b>1,464,948</b>		

-continued-



**Table 6.-Page 2 of 2.**

Receiving Water	Number Stocked	Release Date	Size (g)
<b>Coho Salmon</b>			
Bolio Lake	16,600	9/18	2.5
Chena HS # 32.9 <sup>b</sup>	1,499	6/25	15.0
Chena HS #32.9	1,499	6/25	15.0
Chena HS # 32.9	1,356	9/18	15.0
Chena Lake	10,428	9/18	18.0
Mark Lake	3,600	9/18	2.5
J Lake	3,000	9/18	2.5
<b>Total coho salmon</b>	<b>37,982</b>		

<sup>a</sup> Brood stock from the Chena River

<sup>b</sup> Coho-chinook salmon cross.

**Table 7.-Number size and release date of Arctic char stocked in AYK Region waters in 1992.**

Receiving Water	Number Stocked	Release Date	Size (g)
Bathing Beauty Pond	700	9/2	62
Big Delta Pond	100	9/23	54
Birch Lake	15,327	9/1	58
Bullwinkle Lake	800	6/22	10
Chena Lake	10,000	9/2	62
Chet Lake	1,600	6/22	10
Dicks Pond	1,000	6/22	10
Donnelly Lake	11,888	6/23	9
Fun Fish Day <sup>a</sup>	50	6/6	722
Ghost Lake	1,000	6/22	10
Grayling Lake	900	6/3, 6/4	722
Harding Lake	16,614	9/30	64
Harding Lake	16,012	9/9	63
Harding Lake	10,692	10/1	61
Harding Lake	17,408	9/29	60
Harding Lake	17,836	9/83	56
Harding Lake	18,412	9/10	56
Harding Lake	17,627	9/11	54
Harding Lake	8,928	6/19	10
Harding Lake	60,603	6/16	9
Harding Lake	11,190	6/23	9
Harding Lake	60,603	6/17	9
Harding Lake	60,000	6/18	9
Hidden Lake	800	6/4	722
Lost Lake	800	6/3	722
Outboard Pit	913	6/5	722
Plack Road Pit	100	6/5	722
Quartz Lake	30,000	6/19	10
Rich 31	900	6/22	10
Sansing Lake	2	6/9	722
Sansing Lake	236	9/22	145
Sansing Lake	100	6/10	722
Shaw Pond	300	9/21	54
Sheefish Lake	1,600	6/22	10
Silver Fox Pit	600	9/21	54
<b>Total Arctic char</b>	<b>395,641</b>		

<sup>a</sup> Held at ADF&G Fairbanks. Not released to the wild.

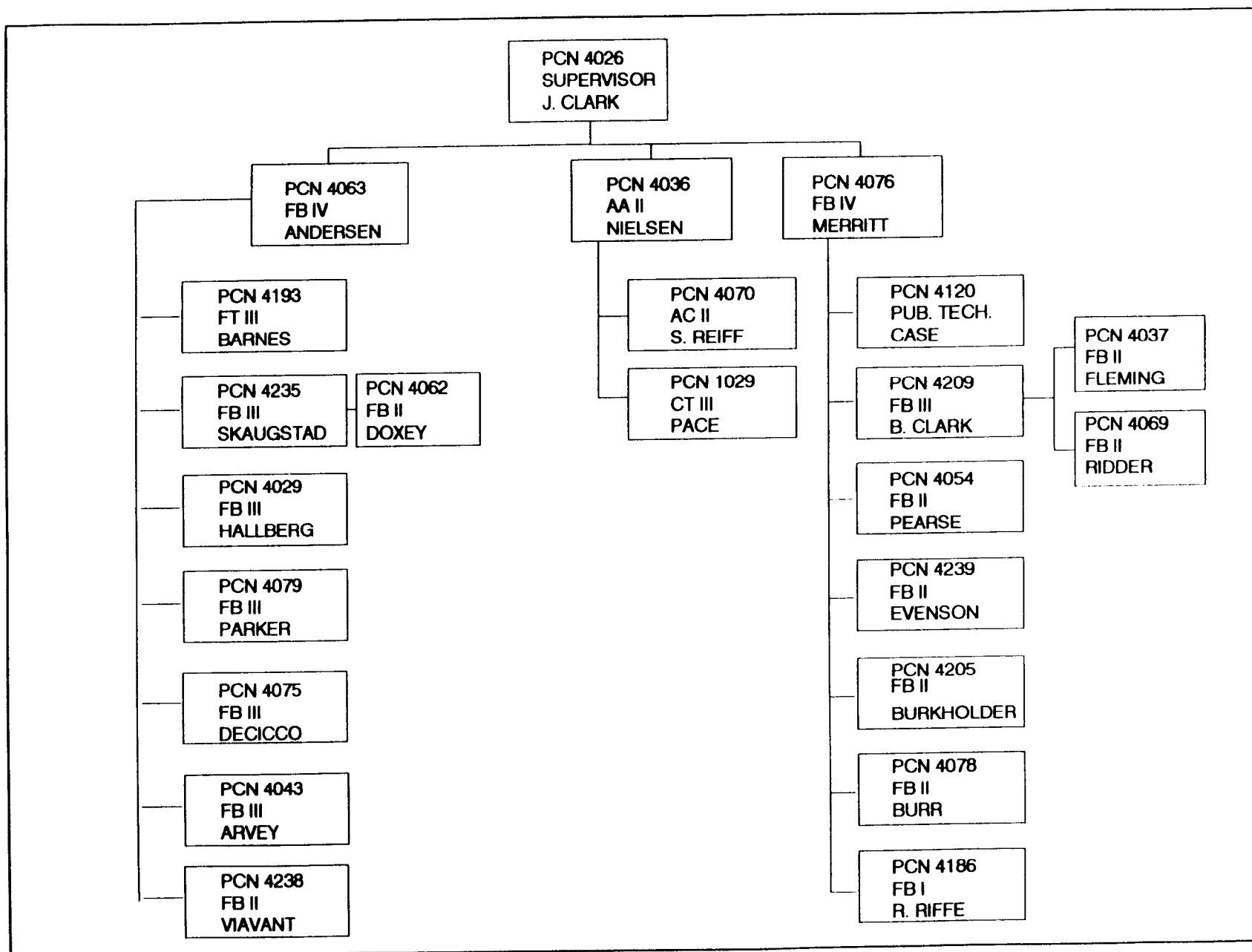


Figure 25.-Organizational chart for A-Y-K Sport Fish staff, January 1992.

(Northwest Alaska Area). Each area manager conducted fisheries research projects in the respective areas. The AYK Area biologist was responsible for a study of Dolly Varden near the North Slope Haul Road; the Lower Tanana River Area biologist conducted creel survey studies in the Fairbanks area; the Upper Tanana Area biologist conducted studies of lake burbot, and northern pike; and the Northwest Area biologist conducted studies on Arctic grayling and Dolly Varden.

The management staff was also engaged in a major effort to prepare management plans for 33 of the important region fisheries. This effort was initiated in 1991 and was still in progress at the close of 1992. Prior to this time, management plans for sport fisheries in the AYK Region had never been prepared. Following internal review of each draft plan (US Fish and Wildlife review was considered internal review for these plans) the plans were released for public review and comment before finalization. Finalized plans are subject to revision at any time, but a firm timetable for this to occur has not been established. Plans completed in 1992 included:

1. Birch Lake sport fishery, June 1992.
2. Chena Lake sport fishery, June 1992.
3. Small stocked lakes in the Tanana Valley, June 1992.
4. Piledriver Slough, June 1992.
5. Quartz Lake, June 1992.
6. Chatanika River, November, 1992

Special research was conducted by W. Ridder on stock assessment of Arctic grayling in the Salcha, Chatanika and Goodpaster rivers, and in the Tangle lakes, all in the upper Tanana Valley. Arctic grayling research in the Salcha, Chena, and Chatanika rivers near Fairbanks, and in Fielding Lake near Delta was conducted by R. Clark. Char research was conducted in northwest Alaska by A. DeCicco, who also directed Arctic grayling studies on the Seward Peninsula. Lake trout research in the Tanana River drainage and Copper River was conducted by J. Burr. Burbot research in rivers of the upper Tanana Valley was conducted by M. Evenson. F. Parker conducted a study of burbot in lakes of interior Alaska. Northern pike studies were conducted by G. Pearse and A. Burkholder in the Tanana River drainage. Evaluation of the fish stocking program was conducted by C. Skaugstad, M. Doxey, and J. Clark. Adult chinook salmon abundance in the Salcha and Chena rivers was estimated by A. Burkholder and M. Evenson. Studies of whitefish abundance and movement in the Chatanika River were conducted by D. Fleming.

## **ACCESS PROGRAM**

The Sport Fish Access Program was incorporated into the activities of Sport Fish Division in 1985. Access Program goals are to increase public access to sport fishing and motorized boating opportunities. The Access Program resulted from the Federal 1984 Wallop-Breaux Amendment to the Dingell-Johnson (D-J) Act. The D-J Act, passed in 1950, exacted a ten percent excise tax on fishing tackle and lures, with money to be distributed to the states for sport fish restoration programs. The Wallop-Breaux Amendment increased the amount of money available under the Sport Fish Restoration Program by incorporating motorboat fuel taxes and duties on imported fishing tackle to the D-J fund. The Wallop-Breaux amendment also mandated that ten percent (raised to 12.5% in 1992) of program funds distributed to states be used for increasing boating access.

## **Program Description**

The Sport Fish Access Program consists of two parts. The first involves larger capital improvement projects. Each written project proposal is subjected to public review, and then submitted for federal approval of funding. Typical projects include construction of boat launches, parking areas, camping areas, handicap-accessible public fishing docks, access roads, improved trails, and the purchase or lease of lands or right-of-ways to ensure public access.

The second portion of the program is called the Small Access Site Maintenance Project. This is an ongoing, annually funded program. Activities include placing and maintaining (replacing vandalized) signs at lake and river angling access sites, constructing and maintaining pedestrian and Off Road Vehicle (ORV) trails to fishing sites, securing permanent rights-of-way on public and private land to ensure continued public access to fishing sites, maintaining access roads to boating or angling sites that might not otherwise be maintained, providing portable toilets, picnic tables, and trash removal at heavily used roadside angling sites, constructing and maintaining outhouses and tent platforms at remote angling sites, and producing and printing publications informing anglers about fishing and boat launching opportunities.

## **Project Implementation**

Potential major access projects can initially be identified by members of the angling and boating public, as individuals or as organized groups, as well as by Sport Fish Division and other state, local, or federal agency staff. Once proposed, projects are initially reviewed by Sport Fish Division staff. Potential projects are evaluated at the regional level for economic feasibility, compliance with state and federal requirements, and compatibility with other regional management goals.

Project proposals may then be forwarded to the statewide Access Coordinator, to prioritize using a formal ranking process, and, if approved at the Divisional level, are forwarded to the U.S Fish and Wildlife Service for federal approval. If approved at the federal level, projects are then included into the annual Access portion of the Department's budget process. These kinds of major projects can be constructed and operated (by formal cooperative agreements) in cooperation with other state agencies, with federal agencies, with local governments such as cities or boroughs, or with local non-profit groups. Many projects are also constructed and operated entirely by Sport Fish Division under the Access Program.

## **Completed Major Projects**

### **Chatanika River Boat Launch**

An existing gravel boat ramp was replaced with a concrete ramp, the associated parking and staging area was enlarged, and an inaccessible rest room was replaced. The site is part of the Chatanika Whitefish Campground and is managed by Division of Parks and Outdoor Recreation. The project is to be constructed in 1993 at a cost of \$150,000.

### **Salcha River Boat Launch**

The parking area was enlarged, the entrance roads and boat ramp approach were upgraded and surfaced, two new toilets were added and the boat ramp was repaired. The site is part of the Salcha River State Recreation Site and is managed by Division of Parks and Outdoor Recreation. The project was completed in 1991 at a cost of \$250,000.

**Harding Lake Boat Launch**

The parking and staging area adjacent to the boat ramp was enlarged, and sound barrier material was placed between the staging area and the adjacent private property. The site is part of the Harding Lake State Recreation Area and is managed by Division of Parks and Outdoor Recreation. The project is to be completed in 1993 at a cost of \$137,000.

**Quartz Lake Boat Launch**

A two lane boat ramp was constructed, the parking and staging area greatly enlarged, and two restrooms and a handicap accessible fishing dock added. The site is part of the Quartz Lake Recreation Area and is managed by Division of Parks and Outdoor Recreation. The majority of the project was completed in 1991, but the handicap accessible fishing dock is to be completed in 1993, at a total project cost of \$700,000.

**Chena Lakes Handicap Accessible Fishing Dock**

A barrier-free fishing dock and associated trail from the existing parking area were constructed. The site is part of the Chena Lakes Recreation Area and is managed by the Fairbanks North Star Borough Department of Parks and Recreation. This project is to be completed in 1993 at a cost of \$50,000.

**Fielding Lake Boat Launch**

A concrete boat ramp, associated parking and staging area, and a rest room were constructed. The site is part of the Fielding Lake State Recreation Site and is managed by Division of Parks and Outdoor Recreation. This project was completed in 1992 at a cost of \$137,000.

**George Lake Lodge Site**

An eight acre site fronting both the Richardson highway and the Tanana River was purchased. The land includes an unimproved boat launch and parking area. The site had been used historically for boat launch access to the Tanana River and to George Lake. Prior to Sport Fish Division purchase of the land, the landowner had closed access for public use due to liability concerns. The site is now owned and managed by the Sport Fish Division Access Program. This project was completed in 1988 at a cost of \$43,000.

**Completed Small Access Projects**

**Access Site Signing.** Over 50 signs have been placed at lakes, streams, and trailheads identifying the sites as angler access sites. Many of these signs have been vandalized and replaced, sometimes more than once.

**Piledriver Slough Improvements**

Picnic tables, trash removal, and portable toilets have been provided during each fishing season, and the land owner (the U.S. Army Corps of Engineers) has constructed organized parking areas and blocked several illegal trespass roads.

**Piledriver Slough Pamphlet**

A small color pamphlet was produced and printed describing the fishery and access points to Piledriver Slough.

**Murphy Dome Road Extension Repair**

This road accesses the lower Chatanika River from Fairbanks, a popular boat launch point for angler access into Minto Flats. The road suffered a wash-out during the fall of 1990. Funds from the Small Access Maintenance Project repaired washed out sections of road in 1991.

### **Angler Access Trails**

Pedestrian or ORV trails to Donna Lakes, Forest Lake, Lisa Lake, several lakes off the Coal Mine Road, as well as into Piledriver Slough were built or upgraded.

### **Angler Access Right-Of-Ways**

In addition to building new trail and maintaining existing trail to angling sites, applications for legal public right-of-ways for trails to several angling sites have been filed with Division of Lands to ensure that public access regardless of future changes in land status.

### **Public Fishing Docks**

Temporary floating and shore-anchored public fishing docks were placed on several interior stocked lakes. Because of high vandalism rates, dock construction and placement will not be continued in the Region III Access Program.

### **Pending Projects**

Two major access projects have been approved but are still pending construction and finalization. The first would construct a concrete boat ramp on the Yukon River at the city of Galena, and install a gravel parking area. This project should be completed during the summer of 1994 and is expected to cost \$100,00. The second project would purchase approximately eight acres of lake frontage at George Lake to allow anglers, boaters, and airplane pilots lakeside access on a lake with no current public land access. This project should also be completed during 1994 and is expected to cost \$70,000.

### **Future Projects**

The following projects are in various planning stages for future implementation.

### **Major Projects**

#### **Chisana River Boat Launch**

An improved gravel boat ramp to the Chisana River would be constructed upstream from the confluence of the Chisana and the Tanana Rivers to provide boat access to the upper Tanana River and to some lakes and sloughs in Tetlin National Wildlife Range. The project would include an enlarged gravel-surfaced parking and staging area. Design and construction of the project would be contracted to private vendors, but managed and overseen by Access Program staff. When completed, the site would be jointly managed by the Sport Fish Division Access Program and Tetlin National Wildlife Refuge.

#### **George Lake Lodge Site Boat Launch**

A gravel boat ramp would be constructed, the access road widened and surfaced with gravel, and the access road provided with adequate drainage to prevent further erosion. Design and construction would be contracted to private vendors, and managed and overseen by Access Program staff. The site would be managed and maintained by the Sport Fish Division Access Program.

### **Small Access Maintenance**

Trails to George Lake, Four Mile Lake, Monte Lake, and the Donna Lakes would be upgraded. Other trails may be constructed, upgraded or maintained as needed. Signs marking angler access sites periodically need replacing due to vandalism, and new signs will be placed as needed. The production and printing of several publications is planned, including a brochure on Interior Alaska river boat ramps, river and stream angling sites, the fishery at Quartz Lake, and an updated

brochure on all stocked lakes in the region. When and if the purchase of land on George Lake is finalized, tent platforms, outhouses, fire rings, and picnic tables will be constructed at several locations on the site.

### **MANAGEMENT AREA FISHERY OBJECTIVES**

Specific management objectives for the region or its constituent areas have been identified only in the management plans developed to date. In addition, a series of general divisional criteria that have been prepared to guide the establishment of fishery objectives that are listed below as priority criteria. These include:

1. **Management and protection of existing fish resources.** Divisional activities should strive to manage and protect Alaska's wild stocks of fish resources for future generations.
2. **Public use and benefits of existing fish resources.** Alaska's fishery resources should be made available for public use and benefit on a sustained yield basis.
3. **Rehabilitation of depressed stocks and damaged habitat.** Division activities should strive to restore and maintain fish habitat damaged by man's activities.
4. **Enhancement of natural production or creation of new opportunities.** The Division should pursue creation of new sport fishing opportunities through rehabilitation of natural stocks or creation of new fisheries where these opportunities do not negatively affect other fisheries.

Many management plans prepared for specific region fisheries also identify a series of fishery objectives. While in many cases the objectives are different, some recur frequently in the plans. They include:

1. Management of sport fisheries so that harvests do not jeopardize sustained yield of the harvested stocks;
2. Maintenance, and/or improvement of public access to fishing opportunities;
3. Promote awareness of sport fishing opportunities that exist; and,
4. Ensure that management costs do not outweigh the public benefits that may be achieved in the fishery.

### **MAJOR BIOLOGICAL AND SOCIAL ISSUES FOR THE AREAS**

1. Chena River Arctic grayling. Depressed stock abundance and catch and release-only fishing restrictions on this once healthy, popular road accessible stock has created public concern for lack of grayling fishing opportunities near Fairbanks. ADF&G is concerned that demand for grayling fishing not be transferred to other nearby weak



stocks, creating a chain effect of stock impact. These concerns have led to recent efforts to rehabilitate the stock using enhancement techniques.

2. Tanana River chinook salmon stocks. Public perception is that the upriver sport fishery must be restricted in many years of lagging escapements to the Chena, Salcha and Chatanika rivers to compensate for overharvests in downriver commercial and subsistence fisheries. Many feel that the sport fishery allocations are too small relative to other uses.
3. Rainbow trout transplant to the Chena River. Public interest in stocking the Chena River with rainbow trout because of the depressed status of native Arctic grayling has caused the Department to examine existing policy for stocking non-indigenous species. No commitment was made to stock the Chena River with rainbow trout during 1992. Initial Department response to this proposal was negative because of concerns for impacts to native stocks of Arctic grayling and to chum and chinook salmon.
4. Wulik River Dolly Varden. Development of a world-class zinc-lead-silver deposit at the Red Dog site in the upper Wulik River drainage carries the risk of heavy metal contamination of one of the most important streams in Northwest Alaska for Dolly Varden. There has been concern that heavy metal contamination of Red Dog and Ikalukrok creeks would occur both from natural leaching of the ore body as it was stripped for ore production and from discharge of impounded waters that were not treated to remove contaminants. Contamination has been controlled to date with impoundment of waste water and treatment of impoundment release water to remove heavy metals.
5. Rural resentment of sport fishing and sport anglers. Rural Alaskans generally have a cultural bias against the concept of "sport fishing" and feel that people do not have the right to "play" with food resources. The bias is particularly strong towards catch-and-release practices. This conflict of values has lead to resentment towards sport anglers who wish to fish on private and public lands within the AYK Region.

## **SECTION II: MAJOR FISHERIES OVERVIEW**

Section II provides a summary of all sport fisheries considered significant in the AYK Region. Included in the section is a description and historical perspective of each fishery; description of the recent performance of each fishery; recent Board of Fishery actions taken relative to the fisheries; social and biological issues that may surround each fishery; and ongoing or recommended research or management activities directed at each fishery.

### **TANANA RIVER DRAINAGE SPORT FISHERIES**

Waters of the Tanana Valley support most of the sport fishing effort and harvest that takes place in the AYK Region as a whole (Table 1). By comparison with statewide sport fisheries, those

taking place in the Tanana Valley have comprised an average of 7.4% of the total amount of estimated sport effort throughout waters of the state from 1982 to 1992.

Fourteen separate sport fisheries in the Tanana River drainage have been identified and described below.

### **TANANA RIVER DRAINAGE SALMON**

The most important fisheries for chinook, chum and coho salmon in tributaries of the Tanana River are described in this section.

#### **Fishery Description and Historical Perspective**

Sport fishing for sea-run chinook salmon in the Tanana River drainage is largely limited to the lower sections of the Salcha, Chena and Chatanika rivers, since these are essentially the only road-accessible stocks of sufficient size to support sport harvests. Annual sport harvests in the Salcha River since 1977 have ranged between 62 (1977) and 904 (1980) chinook salmon, while harvests in the Chena and Chatanika rivers generally smaller, ranging as high as 375 in the Chena, and 373 in the Chatanika River (Table 8).

Sport harvests of chinook salmon in the Chena and Salcha rivers are expected to fall within the guideline harvest ranges established by the Board of Fisheries. These guidelines were established in recognition that chinook salmon in the Yukon River are fully utilized and allocated to various user groups throughout the basin. The guideline harvest range of chinook salmon is 300-600 fish for the Chena River and 300-700 fish for the Salcha River. These ranges have never been exceeded in the Chena River, but sport harvest has exceeded 700 fish on the Salcha River in five of the sixteen years of record. Since both fisheries are not monitored intensively during the fishing season, the Department lacks ability to detect whether the ranges are exceeded during any given year. Post season adjustments to harvest rates in following years would be necessary if it becomes apparent that the sport fishery can consistently take more than the allocated number of salmon.

Estimates of the sport harvest of Chatanika River chinook salmon increased from fewer than 50 fish annually in the late 1970's to 200-400 fish during three of the years a decade later (Table 8). Estimates of harvest in some years exceeded observed escapement. A few anglers target chinook salmon while fishing in the Chatanika River during July and early August. Most of these anglers utilize catch and release fishing practices.

The Delta Clearwater River supports the largest documented spawning run of coho salmon in the Yukon River drainage (Bergstrom et al. 1992). Anglers harvest some of these salmon on the spawning grounds but the proportion is small in comparison to the annual spawner counts, averaging only about 8% since 1984. Since the mid-1980's, coho salmon returning to the Delta Clearwater River to spawn have been the target of an increasingly popular sport fishery that takes place during September and October. Anglers fish along a stretch of shore within approximately one mile of the State campground. Some also use boats to fish for salmon in other parts of the stream, which is about 20 miles in length. Because the fishery is for spawning fish, flesh quality is only fair to poor and many anglers catch and release coho. Harvests during the period from 1977-1992 averaged about 600 coho salmon (Table 9), with a high harvest of about 1,700 fish in 1991.

Clear and Julius creeks in the Nenana River drainage, both support smaller stocks of coho salmon that are fished by anglers in the fall. The Department has little information on the fishery or the

**Table 8.-Sport harvest and catch<sup>a</sup> of chinook salmon in the Tanana River drainage (1977-1992).**

Year	Salcha River	Chena River	Chatanika River	Other Streams	Total
<b>Harvest</b>					
1977	62	29	9	0	100
1978	105	23	35	9	163
1979	476	10	29	0	515
1980	904	0	37	0	941
1981	719	39	5	0	763
1982	817	31	136	0	984
1983	808	31	147	62	1,048
1984	260	78	0	0	338
1985	871	37	373	75	1,356
1986	525	212	0	44	781
1987	244	195	21	42	502
1988	236	73	345	199	853
1989	231	375	231	126	963
1990	291	59	37	52	439
1991	373	110	103	44	630
1992	47	39	16	16	118
<b>Mean</b>	436	84	95	41	656
<b>Catch<sup>a</sup></b>					
1990	680	401	164	87	1,332
1991	515	258	181	245	1,199
1991	86	71	31	16	204

<sup>a</sup> Information available from 1990-1993. Anglers may have harvested or released fish tallied as "catch".

**Table 9.-Sport harvest and catch<sup>a</sup> of coho salmon in the Tanana River drainage (1977-19992).**

Year	Delta Clearwater River	Nenana River Drainage	Other Streams	Total
<b>Harvest</b>				
1977	31	0	63	94
1978	126	0	13	139
1979	0	0	25	25
1980	25	0	42	67
1981	45	0	0	45
1982	21	0	31	52
1983	63	0	84	147
1984	571	0	260	831
1985	722	0	74	796
1986	1,005	168	201	1,374
1987	1,068	0	163	1,231
1988	1,291	255	691	2,237
1989	1,049	125	422	1,596
1990	1,375	261	83	1,719
1991	1,721	359	265	2,345
1992	615	89	411	1,115
<b>Mean</b>	608	79	177	863
<b>Catch<sup>a</sup></b>				
1990	3,271	664	107	4,042
1991	4,382	1,679	750	6,811
1992	1,555	583	657	2,785

<sup>a</sup> Information available from 1990-1993 only. Anglers may have harvested or released fish tallied as "catch".

stock, except for estimates of harvest and catch since 1988. The highest harvest is estimated to have taken place in 1991 in the Nenana River drainage, when 359 coho salmon were harvested (Table 9).

The Tanana River drainage supports several chum salmon stocks, of both the summer run as well as the fall run varieties. Summer chum salmon spawn in almost all the larger run-off streams such as the Chatanika, Chena, Salcha, Goodpaster, Nenana and Tolovana rivers. Fall chum salmon spawn in the Toklat, Delta, and Delta Clearwater rivers and in portions of the mainstem Tanana River where upwelling spring water occurs. Sport fisheries for chum salmon in Tanana River tributaries is generally light and sporadic, with the highest harvest in 1985 when 1,255 were estimated to have been harvested (Table 2).

### **Recent Fishery Performance:**

The 1992 sport harvest of 47 chinook salmon, in the Salcha River, estimated by the SHS, (Mills, 1993), was the lowest recorded in the 16-year database. Low sport catches in 1992 were due to the sport fishing closure for salmon in the Tanana River drainage from July 24 until August 15, the majority of the peak migration period for chinook salmon fishing in local streams of the Fairbanks area. Fishing was closed for salmon when it became apparent in mid-July that spawning escapements were very low and not improving at a sufficient rate.

A total of 39 chinook salmon were estimated to have been harvested in the Chena River sport fishery in 1992, fewer than the previous 15-year mean of 87 fish, and fewer than the previous 5-year average of 162 fish.

In 1990, an estimated 164 chinook salmon were caught in the Chatanika River, while 117 (76%) were released, and in 1991, 181 chinook were caught and 99 (55%) released. Comparable figures in 1992 were 31 caught and 15 (48%) released (Table 8).

In 1990, an estimated 3,271 coho salmon were caught in the Delta Clearwater River of which 1,375 (42%) were kept, and in 1991 4,382 were caught and 1,721 (39%) kept. The estimated harvest of 615 coho salmon in 1992 represents the smallest since 1984, and is well below the recent 7-year (1985-1991) mean of 1,176 fish. A total of 1,555 fish were caught in 1992, indicating that 60% of the angler catch was released. The harvest of coho salmon in the Nenana River drainage in 1992 is estimated to have been 89 fish, compared to 261 in 1990, and 359 in 1991. The Delta Clearwater River coho salmon fishery was restricted to catch-and-release fishing only by Department emergency order on October 16, in response to low escapement counts in the Delta Clearwater River (Appendix C). A similar restriction was not enacted in the Nenana River drainage because escapement information was not available.

An estimated 2,272 chum salmon were caught in the Tanana River drainage in 1992, and 690 (30%) were kept and harvested. The recent 10-year (1982-1991) average harvest of chum salmon is 677 fish.

The Salcha River spawning escapement of chinook salmon in 1992 was estimated<sup>1</sup> to be less than desired by ADF&G for reproductive purposes (ADF&G 1993). Escapements estimated by aerial survey that equal or exceed 2,500 adult spawning fish are considered desirable, and the peak aerial escapement estimate of 1,484 chinook salmon in 1992 failed to reach the established goal.

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<sup>1</sup> Estimated by fixed wing aerial survey.

Since 1980, escapements have ranged from as few as 1,031 to as many as 6,757 chinook salmon under good survey conditions in the Salcha River. The average escapement from 1980 to 1990 (12 data points), is 2,656 chinook salmon. Estimates of escapement from aerial surveys conducted under good conditions have ranged from 1,276 to 2,553 fish during the 1980 to 1991 period, with an average (10 data points) of 1,902 fish per year. Escapement objectives (estimated by aerial survey) for the Chena River have been set at 1,500 chinook salmon, and the 1992 escapement estimate of 817 fish failed to meet the goal.

Recent escapement estimates of chinook salmon in the Chatanika River are not available because of limited stock assessment in this river for chinook salmon. Aerial estimates of escapement range from fewer than 20 fish in 1978 to approximately 160 in 1982. Because only one section of the river is surveyed and because only a portion of the total escapement can be seen from the air, the estimates represent an unknown fraction of the actual number of spawning fish.

#### **Recent Board of Fisheries Action:**

Because estimated harvests on the Chatanika River exceeded observed escapements in some years, the Board of Fisheries recently adopted a regulation prohibiting chinook salmon fishing in the primary spawning area (upstream of a regulatory marker placed approximately one mile upstream of the Elliott Highway Bridge). This regulation is similar to others that close spawning grounds to sport harvest in the upper Chena and Salcha rivers.

#### **Current Issues:**

Public perception with many sport anglers in the Fairbanks and Delta areas is that allocations to the upriver salmon sport fisheries are too small and that sport fisheries must be restricted in many years to compensate for perceived overharvests in downriver commercial and subsistence fisheries. Many feel that the sport fishery allocations are too small relative to other uses, and that when closures are needed to protect escapements, as they were in 1992, they are directed unfairly at the sport users. These issues are discussed at many fisheries related meetings held throughout the area during the year.

A flood control structure, built by the US Army Corps of Engineers (COE) upstream of Fairbanks on the Chena River is designed to divert water when dam floodgates are closed during flood events, from the Chena River, west to the Tanana River via a floodway. Many in the Fairbanks and North Pole area are concerned that the dam and floodway entrap smolt salmon during their downstream migration when the floodgates on the dam are closed. Pressure on the COE is mounting for additional studies of dam impacts upon salmon.

#### **Ongoing Research and Management Activities:**

In addition to aerial survey estimates of escapement by the Division of Commercial Fisheries Management and Development (CFMDD), mark-recapture experiments to estimate spawner abundance have been conducted since 1986 in the Chena River and 1987 in the Salcha River by the Sport Fish Division. Results of the abundance estimates in 1992 indicated that 7,862 adult chinook salmon returned to the Salcha River, compared to the peak aerial survey count of 1,484 fish (Skaugstad 1993a). It was estimated that 5,230 adult chinook salmon returned to the Chena River in 1992, compared to the peak aerial survey count of 825 fish (Evenson 1993a).

Coho salmon escapement to the Delta Clearwater River is estimated annually by Sport fish Division personnel, utilizing direct observation methods from a boat. The survey is conducted the third week in October, during what is believed is the peak abundance of spawners.

### **CHENA RIVER ARCTIC GRAYLING**

This fishery represented the most sustaining and reliable one for the Fairbanks urban area for many years.

#### **Fishery Description and Historical Perspective:**

The Chena River (Figure 26) is a typical interior Alaska stream that supports several species of resident freshwater and anadromous fish. The stream passes through many urban neighborhoods in Fairbanks and the surrounding suburbs and parallels an improved road for about 50 km east of Fairbanks. The fishery for Arctic grayling, when active during the early years of the 1980's, was utilized by anglers fishing from the banks at access points along the roads, float parties on more extended trips in the upper half of the drainage, and anglers fishing from powered boats in the lower third of the drainage. The fishery occurred almost exclusively during the open water period, from early May until early October in most years.

The Chena River and its tributaries, including Badger Slough supported the largest Arctic grayling fishery in North America, with harvests exceeding 30,000 fish, and effort exceeding 30,000 angler-days annually in some of the years preceding 1984 (Table 10; Clark 1994).

During the period from 1979 to 1992, the sport harvest averaged 13,840 fish annually, and effort for all species averaged 25,022 angler-days. However the status of this fishery has changed since 1984, and sport harvest for Arctic grayling has declined to historic low levels. Harvest decreased 76% from 1984 to 1985, although effort declined only 39% during that period. Concomitant with the declining sport fishery after 1984, was the decline in Arctic grayling population abundance. Stock assessment projects during 1986 (Clark and Ridder 1987) and 1987 (Clark and Ridder 1988) reported a decline in population abundance of 49% between these two years.

Clark (1987) attributed declines in abundance and fishing success in the Chena River since 1984 to both sport fishing overharvest and to reduced recruitment because of unfavorable environmental conditions (primarily high river discharge during the natal year).

#### **Recent Board of Fisheries Action:**

New fishery regulations adopted by the Alaska Board of Fisheries in 1987 to deal with the decline in Chena River Arctic grayling were the first changes in management since 1975, when the daily bag limit was decreased from 10 to 5 fish. Regulations adopted in 1987 were first implemented in the summer of 1987, when the Department processed emergency regulations to reduce harvest of grayling until a new Board of Fisheries meeting could be convened in the fall of 1987. New regulations adopted in 1987 were:

- 1) catch-and-release fishing from 1 April to the first Saturday in June;
- 2) 12 inch (305 mm) minimum total length limit from the first Saturday in June until 31 March;
- 3) use of artificial unbaited lures only, with bait fishing allowed downstream of the Moose Creek Dam with hooks having a gap larger than 0.75 inch (19 mm);

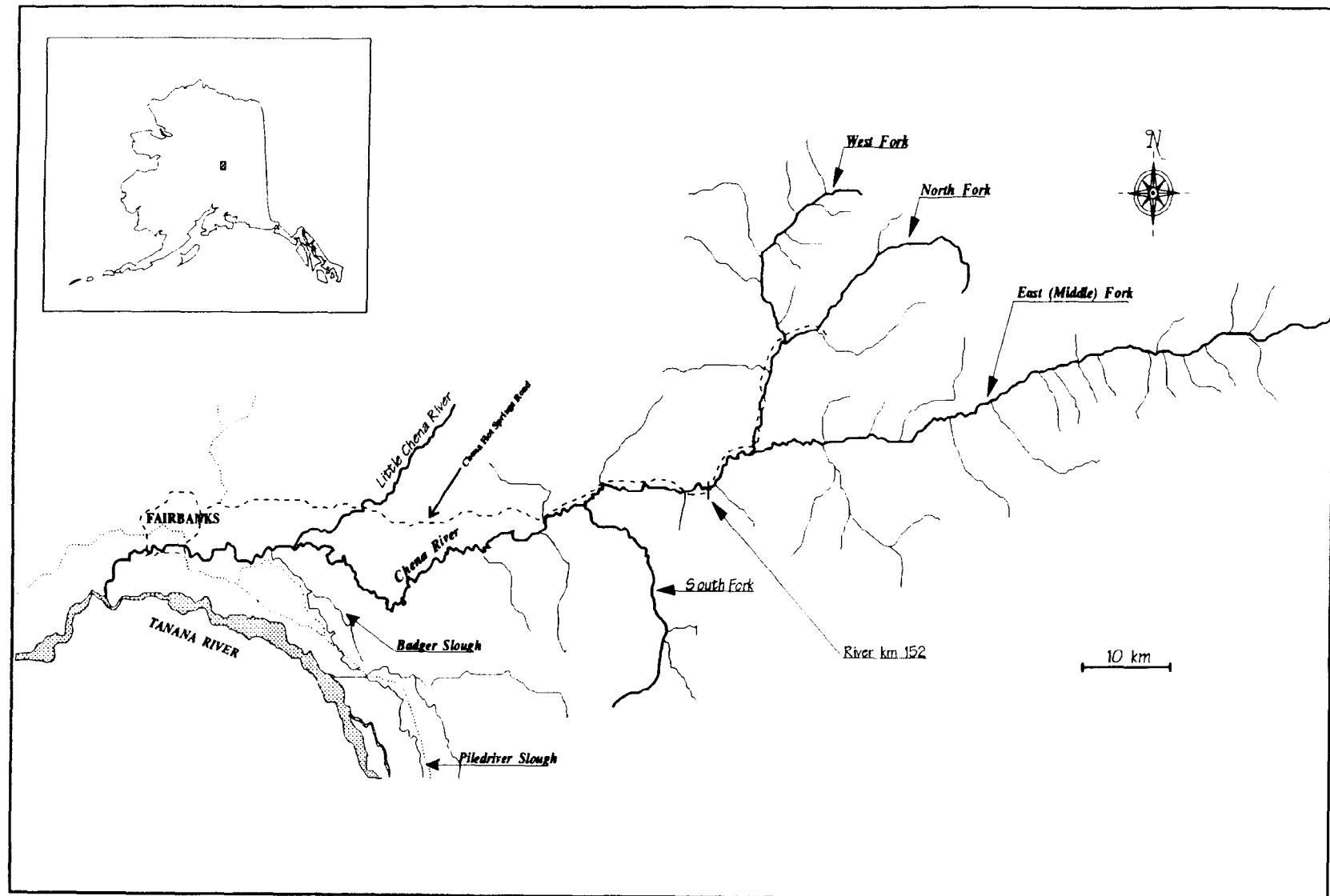


Figure 26.-The Chena River drainage.



**Table 10.-Summary of total angling effort and Arctic grayling harvest on the Chena River, 1977-1991 (taken from Mills 1979-1992).**

Year	<u>Lower Chena River<sup>a</sup></u>		<u>Upper Chena River<sup>b</sup></u>		<u>Entire Chena River</u>	
	Angler-days	Harvest	Angler-days	Harvest	Angler-days	Harvest
1977 <sup>c</sup>					30,003	21,723
1978 <sup>c</sup>					38,341	33,330
1979	9,430	11,290	8,016	11,664	17,446	22,954
1980	13,850	18,520	10,734	16,588	24,584	35,108
1981	11,763	10,814	10,740	13,735	22,503	24,549
1982	18,818	11,117	15,166	12,907	33,984	24,024
1983	17,568	7,894	16,725	10,835	34,293	18,729
1984	20,556	13,850	11,741	12,630	32,297	26,480
1985	11,169	2,923	8,568	3,317	19,737	6,240
1986	18,669	4,167	10,688	3,695	29,357	7,862
1987 <sup>d</sup>	12,605	1,230	10,667	1,451	23,272	2,681
1988 <sup>d, e</sup>	16,244	2,686	9,677	1,896	25,921	4,582
1989 <sup>d, e</sup>	20,317	7,194	10,014	5,441	30,331	12,635
1990 <sup>d, e, f</sup>	18,957	3,494	6,949	945	25,906	4,439
1991 <sup>d, e, f, g</sup>	12,547	2,997	8,591	722	21,138	3,719
1992 <sup>g</sup>	7,671	0	4,983	0	12,654	0
Averages <sup>h</sup>	15,576	7,552	10,637	7,371	26,213	14,923

<sup>a</sup> Lower Chena River is from the mouth upstream to 40 km Chena Hot Springs Road (Mills 1988). In 1991, the lower Chena River included Badger Slough. Angling effort is for all species of fish.

<sup>b</sup> Upper Chena River is the Chena River and tributaries accessed from the Chena Hot Springs Road beyond 40 km on the road (Mills 1988). Angling effort is for all species of fish.

<sup>c</sup> angler-days and harvest are computed for the Chena River and Badger Slough.

<sup>d</sup> Special regulations were in effect during 1987 through 1991. These regulations were: catch-and-release fishing from 1 April until the first Saturday in June; a 305 mm (12 inch) minimum length limit; and, a restriction of terminal gear to unbaited artificial lures.

<sup>e</sup> In addition to the special regulations, a catch-and-release area was created on the upper Chena River (river km 140.8 to 123.2).

<sup>f</sup> The daily bag and possession limits were reduced from five fish to two fish in 1990.

<sup>g</sup> During 1991 and 1992, the Chena River and its tributaries were closed to possession of Arctic grayling from 1 July through 31 December.

<sup>h</sup> Averages are for 1979 through 1991 only.

- 4) catch-and-release fishing year around from river kilometer 140.8 downstream to river kilometer 123.2; and,
- 5) possession limit reduced from 10 to five fish (Tanana River drainage-wide regulation).

In 1990, continued concern for the stock prompted the Board of Fisheries to implement a bag limit of two fish throughout the river, and to allow only single hooks upstream of the Moose Creek Dam. Even with these measures in effect, the Department stock assessment studies could detect little or no stock recovery, and it became necessary to adopt a policy of no consumptive use in 1991. Daily bag limits in the Chena River drainage were thus reduced to zero fish on 1 July, 1991 by Department Emergency Order, allowing only catch-and-release fishing to occur throughout the entire year. The Emergency Order remained in effect throughout 1992 as well.

### **Current Issues:**

Collapse of the Chena River grayling sport fishery and the reduction in local sport fishing opportunities for residents of the Fairbanks area, has stimulated interest in stocking the river with rainbow trout, a species not native to the Yukon or Tanana drainages. Fisheries professionals generally do not favor introduction of exotic species into flowing waters because of probable increased competition with native grayling stocks, as well as the possible predation effects on other anadromous fish such as salmon that are presently believed to be in healthy condition. Those interested in such a transplant feel that all species could co-exist in equilibrium because other Alaska streams support this species mix. Economic arguments that center on the potential attraction for new tourists to the area, based upon rainbow trout fishing opportunity, are advanced by those favoring the stocking proposal. No commitments had been finalized in either direction by the close of 1992.

### **Recent Fishery Performance:**

There was no reported harvest in 1992, while effort for all species was about half of the annual average number of angler-days (Table 10; from Clark 1994). The Arctic grayling harvest of 3,719 fish in 1991 represents the second smallest since estimates were begun in 1977.

### **Ongoing Research and Management Activities:**

The Chena River stock of Arctic grayling has received more research attention throughout the previous 40 years than any other stream or lake stock in Region III, and probably within the state of Alaska. Approximately 60 report titles are available in the literature (Armstrong et al. 1986) that describe grayling studies by state and federal agencies, the University of Alaska, and other institutional entities. A large proportion of the studies have been supported by the Federal Aid in Fisheries Restoration Program, which sponsored fisheries research on the Chena River beginning in the early 1950's with the U.S. Fish and Wildlife Service and the Alaska Game Commission. Since Statehood in 1959, most of the Federal Aid money for fisheries research has been allotted to the State of Alaska and the Sport Fish Division of the Alaska Department of Fish and Game. The grayling population and the sport fishery that depended on it collapsed in spite of the information base available on the Chena River and its population of grayling that had been accumulated by generations of fishery workers.

The Department initiated a program of stock rehabilitation for Chena River Arctic grayling in 1991. The program consisted of: 1) regulation changes (as described above) to ensure adequate protection of the stock; and, 2) a program of supplementation of natural production with releases

of hatchery and pond-reared Arctic grayling, artificially spawned from Chena River stock. Beginning in the spring of 1992, the first lot of fertilized eggs were taken from the Chena River for use in supplementing natural production. During 1993 a second lot of fertilized eggs were taken and 64,936 (97 g fish) from the 1992 brood) were stocked into the Chena River after having been reared at the Clear Hatchery since the spring of 1992.

## **OTHER STREAM AND LAKE ARCTIC GRAYLING**

Significant sport fisheries for Arctic grayling have been documented in: Piledriver Slough, Chatanika, Salcha, Delta Clearwater, Richardson Clearwater and Goodpaster rivers, Tangle and Fielding lakes, and Shaw Creek.

### **Fishery Description and Historical Perspective:**

The Chatanika and Salcha rivers have supported the largest annual harvests during the 16 year period from 1977 to 1992 (Table 11). The fishery in Piledriver Slough has developed since 1976 when clear water conditions were created by damming the upstream portion to intrusion of silty waters from the Tanana River. After clear water conditions were established, the 22 mile long slough was colonized by species native to the area, including grayling. Anglers have been attracted to the fishery by the stocking of rainbow trout by ADF&G since 1987. Shaw Creek supports a small grayling fishery, and before spring sport fishing closures were adopted in the Tanana Valley, the fishery targeted on spawners about to migrate upstream in Shaw Creek just at break-up. Grayling that spawn in Shaw Creek migrate to feed in other local and nearby streams such as the Richardson Clearwater River. The Delta Clearwater River is a spring-fed system that supports grayling only in the summer. It is believed that the stock using the stream for summer feeding spawns primarily in the Goodpaster River.

Concerns for the conservation of several Tanana River drainage Arctic grayling stocks were identified from stock status studies conducted during the latter half of the 1980's decade. Shaw Creek, the Delta Clearwater River, Richardson Clearwater River and Chena River Arctic grayling stocks were considered in danger of over-exploitation.

In spite of (or perhaps, because of) large historic annual harvests in the Tanana Area, there have been no trophy Arctic grayling (larger than 1.4 kg, 3.0 lb) registered since the inception of the trophy program in the mid-1960's, while 137 individuals have been recorded from rest of the state. Growth rates of individual Arctic grayling in the Tanana River drainage are considered to be typical for Alaska, however, growth rates of Arctic grayling in Bristol Bay, and the Seward Peninsula, where the majority of the trophy fish have been taken, are exceptionally high. It is also possible that Tanana River drainage populations have been maintained at smaller individual size from steady fishing and natural mortality, so that even though growth rates are normal, most individuals are removed before reaching minimum trophy size.

### **Recent Fishery Performance**

Harvest estimates for all systems were low in 1992 compared to the computed average harvests. Overall, the Tanana drainage harvest of grayling in 1992 was 61% less than the long term average harvest estimate (Table 11). With two exceptions, harvest estimates in all systems have been lower than average since 1989.

Separate estimates of angler effort for each fishery are not available.

**Table 11.-Sport harvest of Arctic grayling in the Tanana River drainage (1977-1992) <sup>a</sup>.**

	Piledriver Slough	Chatanika River	Salcha River	Delta Clearwater River	Richardson Clearwater River	Goodpaster River	Fielding Lake	Tangle Lake	Shaw Creek	Other	Total
<b>Harvest</b>											
1977	NR	6,737	6,378	6,118	NR	NR	NR	NR	NR	16,828	36,070
1978	NR	9,284	9,067	7,657	NR	NR	NR	5,786	NR	18,151	49,945
1979	NR	6,121	5,980	6,492	NR	NR	NR	3,466	NR	19,908	41,967
1980	NR	5,143	5,351	5,680	NR	NR	NR	5,522	NR	16,629	38,325
1981	NR	3,808	3,983	7,362	1,562	NR	1,913	6,858	NR	22,248	47,734
1982	NR	6,445	6,843	4,779	1,729	NR	3,044	9,590	NR	20,005	52,435
1983	5,822	9,766	9,640	6,546	2,822	3,021	2,035	7,794	NR	3,126	44,750
1984	3,751	4,180	13,305	4,193	1,376	1,194	935	4,829	2,570	2,752	35,334
1985	2,306	7,404	5,826	5,809	798	2,757	1,023	5,029	2,584	2,376	33,606
1986	2,312	2,692	7,540	2,343	827	1,508	1,329	4,781	505	12,645	36,482
1987	4,907	5,619	4,762	2,005	251	1,702	910	2,467	567	11,950	35,140
1988	8,095	8,640	2,383	2,910	509	1,273	1,492	3,711	873	16,551	46,437
1989	4,459	6,934	5,721	3,016	972	1,964	1,283	3,116	411	12,178	40,054
1990	2,380	4,237	1,992	1,772	523	760	1,097	2,853	203	15,817	31,634
1991	3,987	2,452	1,688	2,165	1,419	636	1,284	4,917	453	11,034	30,035
1992	1,030	1,751	1,592	797	378	485	548	2,577	113	5,712	14,983
Mean	3,905	5,701	5,754	4,353	1,097	1,530	1,408	4,886	920	12,994	38,433

<sup>a</sup> Excluding the Chena River.

NR = Harvest estimate not available.

### **Recent Board of Fisheries Action**

In 1975, because of increased fishing effort associated with the influx of people for the construction of the trans-Alaska pipeline, the daily bag limit in the Tanana River drainage was decreased from 10 to five Arctic grayling. The reduction in bag limit in 1975 to five fish daily and 10 in possession did not prevent the decline of important Arctic grayling stocks. Further restrictions were enacted in 1987, including a decrease in the possession limit to five Arctic grayling daily, and institution of a minimum length limit of 30.5 cm (12 inch) in the Chena River. Additional conservation measures were also enacted for other stocks in the Tanana River drainage. The Alaska Board of Fisheries (BOF) in 1992 enacted restrictions for the Chatanika River that mandate catch-and-release fishing from April 1 until the first Saturday in June and the use of unbaited artificial lures during that period. Regulations in effect in 1992 are summarized in Appendix D.

### **Current Issues**

Greatly increased fishing effort on Piledriver Slough since introduction of rainbow trout there in 1987 has had an effect upon fishing mortality rates of grayling that utilize the system during summer months. The close proximity of Piledriver Slough to Fairbanks and to Eielson Air Force Base, its accessibility, and abundances of both stocked rainbow trout and grayling have created an extremely popular fishery. Piledriver Slough received an estimated 15% of all angler effort for the Tanana River drainage in 1990 (27,705 angler-days) more than any other single fishery in the drainage. The Department is challenged to maintain healthy wild stocks of grayling in the face of expanding fishing effort for the introduced rainbow trout.

### **Ongoing Research and Management Activities**

Stock assessment studies for Arctic grayling and rainbow trout have been conducted at Piledriver Slough since 1990. Abundance, stock composition, growth, maturity, and mixing rate parameters were estimated for Arctic grayling (Timmons and Clark 1991, Fleming 1991, Timmons 1992, and Fleming and Schisler 1993). Future efforts are planned in order to monitor the grayling population with respect to increased participation in the sport fishery.

Arctic grayling were sampled in 12 waters of the Tanana River drainage to estimate the age and size at sexual maturity (Clark 1992). Results of the study suggest that a minimum length limit of 305 mm as is currently in place in seven of the studied waters, would allow more than 50% of mature fish the opportunity to spawn at least once in five of the seven waters and that the limit should be reevaluated for the Salcha River and Caribou Creek (tributary to Shaw Creek).

Studies to assess grayling stocks of the Salcha, Chatanika and Goodpaster rivers and Fielding Lake were conducted in 1992 (Ridder et al. 1993; Clark 1993c). Stock composition and abundance of each population, and survival and recruitment rates in Fielding Lake were investigated as part of ongoing stock assessment studies on grayling in the Tanana River drainage.

Interannual, intrastream movements of grayling were examined using marks placed on fish in the Chena, Salcha and Goodpaster rivers (Clark 1993b). Results to date indicate high fidelity to original release sites through multiple years of recapture. Future examination of movement is made possible by stock assessment work in which individual numbered tags are applied to captured grayling.

## **MINTO FLATS NORTHERN PIKE**

Minto Flats, has for many years, supported a sport fishery that predominantly targets northern pike.

### **Fishery Description and Historical Perspective**

Anglers gain access to various areas in the Minto Flats by float-equipped aircraft and by boat during summer and by ski-equipped aircraft and snow machine during winter. The Minto Flats may be reached by road via the Elliott Highway at New Minto Village and via the Murphy Dome Road extension that terminates at a boat-launch point on the lower Chatanika River. Boats are also launched at Nenana and run downstream to the mouth of the Tolovana River or to Swanneck Slough which connects with the Tolovana River in the flats complex.

Since 1977, estimates of fishing effort for all species have ranged from 700 angler-days in 1989 to about 3,900 angler-days in 1977, averaging 2,100 angler-days during the 1977-1991 period (Mills 1978-1993). The northern pike population of Minto Flats is also subject to a sport harvest that occurs in the lower portions of the Chatanika River. Harvests in this area are sometimes reported as Minto Flats harvests and at other times as Chatanika River harvests. Annual harvest of northern pike is thus best depicted as the sum of the harvests in Minto Flats and in the Chatanika River. An average of about 2,800 pike per year have been harvested from Minto Flats by sport fishermen since 1977. Sport harvests have ranged from about 1,600 fish in 1990 to about 4,900 fish in 1986 (Table 12).

Minto Flats supported Alaska's largest sport fishery for northern pike from the late 1970's until the mid-1980's. A new development occurred in the sport fishery in 1985. During early winter in 1985-1986, anglers located a major overwintering area for pike inhabiting the south-eastern portion of the flats. Effort was attracted to, and concentrated on, this population of overwintering fish in the winter of 1986-1987 as well, and large numbers of sport anglers were able to quickly fill bag limits with large northern pike. It was estimated that over 90% of the pike taken in this fishery were mature, pre-spawning, female fish. As a result, harvests in 1985 and 1986 were approximately double the harvests that occurred in the previous four years. Concern over increased harvests and the high female composition of the harvests led ADF&G to close the winter fishery by emergency order throughout Minto Flats in January 1987.

Pike are widely dispersed in Minto Flats in the summer, especially in the large shallow lakes that characterize these wetlands. Winter oxygen deficiency in shallow lakes forces fish to migrate to flowing waters sometime before, or after freeze-up. Between mid-April and mid-May, northern pike migrate from over-wintering areas to many lakes and waterways within the flats complex for summer feeding.

ADF&G stock assessment studies suggest that, in recent years, northern pike abundance in Minto Flats has been increasing, and that the stock has supported sustainable harvests. There is evidence that the northern pike population has recovered from over-fishing that occurred in the mid-1980's, and that it may sustain even larger sport harvests in future years.

### **Recent Fishery Performance**

In 1991, anglers caught an estimated 640 northern pike 30 inches or longer and retained about 400 of them. About 4,800 pike under 30 inches were caught and 1,800 (38%) of these were retained.

**Table 12.-Sport harvest and catch<sup>a</sup> of northern pike in the Chatanika River and Minto Flats (1977-1992).**

Year	Chatanika River	Minto Flats	Total
<b>Harvest</b>			
1977	121	3,615	3,736
1978	407	3,300	3,707
1979	71	3,209	3,280
1980	458	3,909	4,367
1981	28	2,009	2,037
1982	305	1,886	2,191
1983	713	1,825	2,538
1984	389	1,960	2,349
1985	763	3,902	4,665
1986	1,282	3,621	4,903
1987	554	1,161	1,715
1988	364	1,128	1,492
1989	812	872	1,684
1990	388	1,182	1,570
1991	398	1,754	2,155
1992	26	1,247	1,273
<b>Mean</b>	442	2,286	2,729
<b>Catch<sup>a</sup></b>			
1990	979	3,967	4,946
1991	520	4,907	5,427
1992	410	5,765	6,175

<sup>a</sup> Information available from 1990-1993 only. anglers may have harvested or released fish tallied as "catch".

In 1992, anglers caught an estimated 855 pike 30 inches or longer and retained 131 of them. They caught 5,320 pike under 30 inches and retained 1,142 (21%) of these.

Northern pike sport harvest from Minto Flats has been less than the long term average harvest since 1986 (Table 12). Harvest in 1992 represents only 47% of the 16 year average annual sport harvest.

### **Recent Board of Fisheries Action**

Review of the Minto Flats sport fishery by the Alaska Board of Fisheries was conducted in 1987. The review resulted in the establishment of a June 1 through October 14 sport fishing season for northern pike in the Tolovana River drainage, which includes Minto Flats. In addition, a bag limit of 5 fish daily, with only one fish equal or exceeding 30 inches total length was instituted at this time. No other recent Board action has taken place since 1987, with the exception of their consideration of a public proposal in 1990 in which the winter closure for the entire Tolovana drainage was questioned. The Board reconfirmed the need for continued restrictions on the winter fishery, and rejected the proposal.

### **Current Issues**

Many sport anglers urge that the sport fishery for northern pike be allowed during winter months, because of recent indications that the population is experiencing recovery. The Department has recommended continued winter harvest restrictions to prevent overfishing on concentrated wintering fish and particularly females.

There has been some resentment expressed by sport anglers that subsistence fishers are allowed to fish with no bag limits and no seasonal closures. This issue is complicated by changing eligibility requirements for subsistence users as a result of court rulings on various legal actions. During the recent 5 year period, subsistence eligibility with the State of Alaska system hinged upon "rural residency" as defined by the Boards of Fish and Game. Court rulings have made this method of determining eligibility no longer applicable, and all Alaska's citizens qualified for subsistence in 1992. Theoretically, access to subsistence fishing in Minto Flats was open to all citizens, and therefore, possibly subject to overfishing in winter months as had been experienced in the mid-1980's.

### **Ongoing Research and Management Activities**

ADF&G initiated a stock assessment program in 1987 for northern pike in Minto Flats, including radio-tagging and tracking to determine winter locations of fish. Abundance estimates of pike in the southeastern portion of Minto Flats continued through 1991 and was then discontinued.

### **TANANA RIVER DRAINAGE NORTHERN PIKE**

Important fishing areas besides Minto Flats include Harding, George, Volkmar, Healy and East Twin lakes (Figures 3 and 4).

### **Fishery Description and Historical Perspective**

Northern pike are harvested by anglers using hook and line gear in summer and winter as well as with spears during the winter. The majority of the Tanana Area harvest comes from lakes that have relatively good access. Through-the-ice fisheries during the two months just prior to spring break-up, when northern pike have concentrated for spawning, have historically accounted for a significant portion of the annual fishing mortality (Minto Flats is closed to fishing from October 15 through May 31).



Additional fisheries for northern pike include West Twin and Wien lakes in the Kantishna River drainage, Fish Lake near the Tanana-Yukon confluence, Wellesley, Dog, Jatahmund, Island, and Deadman lakes, Moose and Scotty creeks in the vicinity of Northway (Figures 2 and 6), and other tributary streams of the Tanana River including the Chena River.

Generally harvest and effort have increased for northern pike in the past 12 years. Past angler surveys indicated that this species is the second most sought-after indigenous sport fish species in interior Alaska (Holmes and Pearse 1987). The total sport harvest of northern pike within the Tanana River drainage has ranged from about 6,000 to 12,500 fish annually although the distribution of the harvest has varied among various fishing sites. Because of increased effort, the catch per angler day has decreased, and some stocks have been over-fished.

Recent studies of northern pike populations within the Tanana River drainage indicated that exploitation rates are higher than sustainable in some populations. Even in populations where exploitation rates are not judged to be excessive (less than 20% per year) as in Volkmar Lake, the number of large fish has declined under only moderate harvest pressure.

A total of 64 (31%) of the 205 statewide registered trophy northern pike (minimum weight of 6.8 kg, 15 lbs) through 1992 was taken from the Tanana River drainage. The Chatanika River, Tolovana River and Minto Flats (considered parts of the Minto Flats complex) account for 25 (39%) of the Tanana River drainage trophy northern pike records, with 14 (22%) from East Twin Lake and eight (13%) from Volkmar Lake. The number of large pike taken from each area may be more reflective of relative fishing effort than of size and growth characteristics of the respective stocks.

### **Recent Fishery Performance**

In 1991, the estimated sport harvest of northern pike in Harding Lake, Minto Flats (including Chatanika River), George Lake, and East Twin Lake was 1,888, 2,155, 1,264 and 635 fish respectively, accounting for about 49% of the harvest of 12,476 northern pike in the Tanana River drainage (Table 13). The harvest estimate for 1991 is the highest since inception of the SHS in 1977.

Estimated harvests in 1992 (Table 13) were below average in almost all locations where estimates are available. The total estimated pike harvest in the Tanana Area of 6,148 fish is approximately 37% less than the 16-year average for the area.

The estimated harvest of northern pike in the Tanana River drainage in 1992 (6,148 fish) constituted about 33% of the estimated statewide harvest (18,616) of this species (Mills 1993).

### **Recent Board of Fisheries Action**

Prior to 1992, there were no seasonal closures for the sport fishery in the Tanana Area outside the Tolovana drainage. Significant sport harvests of pike were made in the spring just preceding the period from April 1 to May 31, during which pike spawn. The Board of Fisheries passed a regulation in 1992, at the suggestion of the staff, to close Tanana Area waters to pike fishing during this time. The intent of the closure is to protect northern pike during the time when they are most vulnerable to anglers when they are concentrated in shallow waters for spawning.

A minimum legal size limit of 26 inches for northern pike harvested from Harding Lake was enacted by emergency regulation (Register 117, April 1991). In using its emergency regulation authority, ADF&G was able to change minimum size limits, something not possible under the

**Table 13.-Sport harvest and catch<sup>a</sup> of northern pike in the Tanana River drainage (1977-1992).**

Year	Harding Lake	Chena River	George Lake	Healy Lake	East Twin Lake	Volkmar Lake	Minchumina Lake	Minto Flats	Other	Total
<b>Harvest</b>										
1977	NR	871	1,227	NR	NR	NR	NR	3,736	3,511	9,345
1978	NR	452	1,392	NR	NR	NR	NR	3,707	2,287	7,838
1979	NR	437	2,018	NR	NR	NR	NR	3,280	2,240	7,975
1980	NR	458	1,395	NR	NR	NR	NR	4,367	3,232	9,452
1981	NR	333	2,236	NR	NR	648	NR	2,037	4,687	9,941
1982	NR	377	1,635	NR	NR	777	NR	2,191	4,842	9,822
1983	178	780	1,322	NR	NR	430	629	2,748	1,925	10,225
1984	766	1,064	1,700	NR	NR	428	NR	2,453	2,468	9,490
1985	503	787	2,670	NR	NR	503	NR	4,146	2,927	12,066
1986	673	664	3,076	NR	NR	657	NR	4,927	1,545	11,854
1987	1,886	169	2,229	462	NR	224	409	1,781	1,955	9,405
1988	2,092	453	1,837	982	346	255	NR	1,492	3,092	11,823
1989	1,764	1,303	882	1,393	832	180	401	1,734	2,361	11,170
1990	591	204	945	152	760	NR	NR	1,570	2,315	7,348
1991	1,888	1,650	1,262	387	635	565	NR	2,155	3,072	12,476
1992	341	256	529	43	546	231	154	1,299	2,168	6,148
Mean	1,068	641	1,647	570	497	415	348	2,726	2,789	9,773
<b>Catch<sup>a</sup></b>										
1990	3,629	1,553	3,950	NA	2,515	NA	NA	4,946	20,931	37,524
1991	5,071	3,019	4,996	NA	3,316	1,011	NA	5,427	7,169	30,009
1992	3,400	1,513	2,861	NA	3,408	1,256	NA	6,175	12,637	32,250

<sup>a</sup> Catch includes fish caught and released.

NR = no harvest or catch reported.

Department's emergency order authority. The reason for not making this change in the usual fashion; preparing a proposal for regulation change by the Alaska Board of Fisheries, was that the next scheduled meeting of the Board would not take place for another year. The northern pike population was considered overharvested with few large fish and little recruitment in recent years, and that a conservation emergency existed. In the same emergency regulation, a prohibition was adopted for the spearing and taking of fish by bow and arrow in Harding Lake.

### **Current Issues**

No current issues are identified in Tanana Area sport fisheries for northern pike outside of those mentioned under the Minto Flats discussion.

### **Ongoing Research and Management Activities**

ADF&G studies of northern pike in the Tanana Area in 1992 were directed towards estimation of appropriate sustained yield values for selected waters. These included Harding, George, Volkmar and T lakes. In all these waters, mark and recapture estimates of abundance were made, along with estimates of age, sex and size composition of the stocks. Study was conducted in each location in early spring, just after ice breakup when pike congregated for spawning in shallow water. Biological composition and abundance was estimated on the northern pike stock in East Twin Lake for the first time in 1992.

### **ALASKA RANGE LAKE TROUT**

Sport fisheries for lake trout occur in many lakes and some streams of the Delta River and upper Tanana River drainages (Burr 1987).

### **Fishery Description and Historical Perspective**

Lake trout most frequently inhabit deep, oligotrophic mountain lakes and are rarely found at lower elevations of the Tanana River drainage. Lakes of the Delta River drainage (Figure 5) including Fielding, Landmark Gap, Glacier, Sevenmile, and the Tangle lakes contain lake trout. Transplanted lake trout occur in Harding Lake (Figure 4) near Fairbanks and although the small numbers do not support a large fishery, some large individuals have been taken. On average, 65% of the AYK Region lake trout harvest is from lakes in the Tanana River drainage. The regional lake trout harvest increased at an annual average rate of 27% from 1978 to 1985. An apparent major decline in abundance occurred and was first observed in 1986 in waters of the Tanana River drainage. Research in both Southcentral and interior Alaska indicates that many road accessible stocks have been overharvested in recent years.

Lake trout are a long lived, slow growing and late maturing species, and the impact of even modest fishing pressure can be significant. Lake trout 25 years of age and older are not uncommon and individuals estimated to be older than 50 years are recorded for Alaska (Burr 1987). Trophy lake trout weighing 8.7 kg (20 lbs) or more are typically 20 or more years old (Burr 1987). Lake trout inhabiting high elevation lakes in the Alaska Range migrate into shallow rocky shoals to spawn in late fall. Lake trout spawn for the first time at ages ranging from 5 to 12 years of age, depending apparently on growth conditions. Alternate year spawning may be more normal than spawning in consecutive years in interior and northern Alaska.

Six trophy (minimum weight 20 lbs or 36 inches long) lake trout are recorded from the Tanana Area, four taken in Harding Lake, one each in Fielding and Upper Tangle lakes.

### **Recent Fishery Performance:**

The harvest of lake trout in the Tanana River drainage peaked at approximately 3,100 fish in 1982. Harvest declined to 713 and 652 in 1986 and 1987, after the bag limit was reduced from 12 to two lake trout per day (Table 14). After two years of reduced harvest, the 1988 harvest of lake trout increased to 2,221 fish (Table 14). However, further investigation of responses to the SHS showed that harvests of lake trout were reported from lakes known to contain only stocked rainbow trout and/or Arctic char, particularly from those lakes on Eielson Air Force and Fort Greely Army bases. Lake trout harvest estimates for the Tanana Area in 1989 totaled 1,932 fish. After eliminating some responses, a more accurate estimate of the 1989 native lake trout harvest in the Tanana River drainage is 1,498 fish. Lake trout harvest estimates for the Tanana Area in 1990 totaled 896 fish of which 253 were reported from unspecified lake locations. Responses to the SHS have not been examined to determine whether any harvest reports included in the unspecified category can be omitted from the Tanana Area total because of similar reporting errors. The estimated 1991 harvest of 1,978 lake trout includes all fish reported as lake trout taken from the Tanana Area. Estimated harvest in 1992 totaled 993 fish, of which about 30% were taken from stocked lakes and ponds.

### **Recent Board of Fisheries Action**

More restrictive bag limits were instituted throughout the Tanana River drainage in 1987 by the Board of Fisheries. At that time the daily limit for most of the drainage was restricted to two fish per day with no size limit. However in Fielding Lake, Harding Lake, and in the Tangle Lakes, where fishing pressure had been more intense, more restrictions were enacted. In Fielding and Harding lakes, the daily bag limit was made two fish, and all harvested fish were required to equal or exceed 18 inches in total length. In the Tangle Lakes the daily bag limit was placed at one fish, with a minimum length limit of 18 inches. No formal Board action has taken place since these changes were made in 1987.

### **Current Issues**

Whether to accept brood stock sources for the lake trout stocking program from outside the Tanana River drainage has been of concern to ADF&G staff until recently. It has been decided that no brood source will be accepted from outside the drainage because of genetics and disease considerations. The lake trout population at Sevenmile Lake was identified as a suitable brood source for the stocking program in 1992.

High harvest rates from Fielding Lake relative to stock size as reported by Mills (1986-1992) indicated that the minimum length limit and regulations in place were inadequate to control harvest at acceptable levels. Fairbanks staff has recommended that the length limit be increased to 22 inches or 24 inches from the current 18 inches.

### **Ongoing Research and Management Activities**

Stocking of lake trout into small roadside lakes in the Tanana River drainage was assessed (Burr 1993). A mail survey was conducted on the question of use of bait and seasonal patterns of fishing for lake trout (Burr and Hansen 1993). Studies showed small lakes to be important for lake trout harvest in the drainage, and the conclusion was drawn that the stocking program was successful and should continue.

**Table 14.-Sport harvest and catch<sup>a</sup> of lake trout in the Tanana River drainage (1977-1992).**

Year	Harding Lake	Fielding Lake	Tangle Lakes <sup>b</sup>	Delta River	Stocked Lakes and Ponds	Other	Total
<b>Harvest</b>							
1977	NR	NR	NR	NR	NR	1,471	1,471
1978	NR	NR	416	NR	NR	187	603
1979	NR	NR	NR	NR	NR	518	944
1980	NR	NR	603	NR	NR	661	1,264
1981	NR	295	864	NR	NR	562	1,721
1982	NR	346	1,079	NR	NR	1,679	3,104
1983	NR	294	2,109	NR	21	10	2,749
1984	NR	169	636	234	26	91	2,000
1985	NR	347	2,376	NR	NR	70	2,984
1986	24	136	409	NR	NR	32	713
1987	NR	127	NR	NR	NR	254	652
1988	55	364	127	NR	1,247	428	2,221
1989	119	195	478	11	283	293	1,932
1990	51	186	236	51	135	153	896
1991	133	295	472	44	443	399	1,978
1992	200	170	208	15	285	54	993
Mean	83	244	696	68	349	507	1,621
<b>Catch<sup>a</sup></b>							
1990	186	321	523	169	NR	1,234	2,433
1991	148	870	988	44	811	1,301	4,162
1992	517	247	1,488	23	547	1,834	4,656

<sup>a</sup> Information available from 1990-1993 only. Anglers may have harvested or released fish tallied as "catch".

<sup>b</sup> Includes Tangle River.

NR = no harvest or catch reported.

## **TANANA RIVER DRAINAGE BURBOT**

The Tanana River supports one of the largest burbot fisheries in the state, rivaled only by burbot fisheries in the Copper River Basin.

### **Fishery Description and Historical Perspective**

Local residents using baited setlines or hand-held fishing gear are the primary participants in this year-around fishing. Most fishing in the Tanana River near Fairbanks occurs during the winter months while in the upper Tanana River drainage, a major portion of the annual harvest occurs in spring and summer. Burbot are fished in streams, such as the Tanana, Chena and Tolovana rivers, and in lakes. Set lines, where a maximum number of hooks that may be used is 15, is the most common gear type in flowing waters of the drainage. In past years, the most heavily fished lakes were Fielding, Harding, and Tangle lakes. Since 1987, bag limits in these lakes were reduced to two fish daily, and use of set lines was eliminated. Burbot stocks in the Tanana River are exploited most heavily near population centers such as Fairbanks, Delta Junction, and near Northway. Burbot movements within the Tanana River tend to minimize effects of concentrated local fishing effort, and stocks in the Tanana River appear to be lightly exploited (Evenson 1990, 1991, 1992).

Of the 196 trophy burbot registered through 1992 in Alaska, (minimum size 3.6 kg, 8 lbs) 103 (68%) were taken in the Tanana Area, and the majority of those were taken near Fairbanks in the Tanana (67, 34%) and Chena (21, 11%) rivers.

### **Recent Fishery Performance**

The estimated harvest of burbot in the Tanana River drainage by sport anglers in 1991 was 2,739 fish. The majority (1,826 fish) of the harvest was taken in the Tanana River and the lower Chena River (Table 15). The fishery harvested an estimated 3,620 burbot in 1992, an amount near the annual historic average, but well below historic harvest estimates for single years (Table 15). A very high proportion of the estimated harvest and catch has been taken in the Tanana and Chena rivers. A smaller proportion has been taken from area lakes since 1987 when restrictions on number of hooks, set lines, and seasons for all lakes except T, Tangles, Harding and Fielding lakes were enacted.

### **Recent Board of Fisheries Action**

To prevent further declines in burbot populations in lakes of the Tanana drainage, the ADF&G implemented emergency regulations in 1987 that prohibited the use of set lines from 15 May to 15 October, and reduced the bag and possession limit in all Tanana drainage lakes to five fish. Also, a ban on the use of set lines throughout the entire year was enacted for Harding, Fielding, T, and Tangle lakes. A further reduction in the bag and possession to two burbot daily in Fielding, T, Harding and Tangles lakes was enacted at that time as well.

### **Current Issues**

Although exploitation rates of burbot in the Tanana River are not considered excessive, studies suggest low stock abundance in most of the lakes examined. Population density of burbot in lakes declined dramatically in the early 1980's due to unsustainable rates of sport fishing exploitation. Stock assessment studies conducted in lakes of the Upper Susitna/upper Copper River basin and the Tanana River drainage, in the mid-1980's (Lafferty et al. 1992), confirmed that several lake stocks in the Tanana drainage showed evidence of high exploitation.

**Table 15.-Sport harvest and catch <sup>a</sup> of burbot in the Tanana River drainage (1977-1992).**

Year	Harding Lake	Fielding Lake	Tangle Lake <sup>b</sup>	Chena River	George lake	Tolovana River <sup>c</sup>	Piledriver Slough	Shaw Creek	Nenana River	Tanana River	Other	Total
<b>Harvest</b>												
1977	NR	NR	NR	642	5	71	NR	NR	NR	NR	829	1,547
1978	NR	NR	72	389	NR	90	NR	NR	NR	NR	832	1,383
1979	NR	NR	88	807	64	45	NR	NR	NR	NR	966	1,970
1980	NR	NR	229	1,127	NR	50	NR	NR	NR	NR	1,285	2,691
1981	NR	249	194	1,317	68	37	NR	NR	NR	NR	2,257	4,122
1982	NR	365.	105	1,457	31	63	NR	NR	NR	NR	1,866	3,887
1983	157	367	84	1,055	105	21	84	42	21	2,623	481	5,040
1984	428	NR	39	1,233	143	52	NR	415	NR	1,921	1,325	5,556
1985	NR	NR	70	2,065	105	280	70	175	NR	1,365	665	4,795
1986	NR	32	104	889	32	473	NR	120	NR	2,948	544	5,142
1987	53	13	NR	149	NR	409	79	607	NR	2,322	223	3,855
1988	73	36	NR	386	218	NR	55	NR	NR	2,419	546	3,733
1989	10	NR	NR	1,322	20	30	100	170	60	2,305	340	4,357
1990	17	NR	17	304	34	17	456	354	68	1,789	743	3,799
1991	45	NR	23	225	11	79	158	45	11	1,601	541	2,739
1992	17	51	17	1,032	110	8	195	161	76	1,717	236	3,620
<b>Mean</b>	100	159	87	896	73	115	150	232	47	2,101	855	3,640
<b>Catch<sup>a</sup></b>												
1990	45	NR	51	338	NR	17	456	726	68	1,975	1,468	5,116
1991	17	NR	23	609	11	56	237	45	11	1,950	587	3,574
1992		51	34	1,235	110	17	203	161	102	2,148	295	4,373

<sup>a</sup> Information available from 1990-1993 only. Anglers may have harvested or released fish tallied as "catch".

<sup>b</sup> Includes Tangle River.

<sup>c</sup> Includes Glacier Creek.

NR = no harvest or catch reported.

### **Ongoing Research and Management Activities**

Several studies of burbot were conducted in 1992 in the Tanana Area. Stock assessment and biological characteristics were studied in the Tanana River (Evenson 1993b) and in Fielding and Harding lakes (Parker 1993). A model for predicting the fecundity of Tanana River burbot was developed by Roach and Evenson (1993). Seasonal movements of radio-implanted burbot in the Tanana River drainage were followed and reported by Evenson (1993c).

### **TANANA RIVER DRAINAGE WHITEFISH AND SHEEFISH**

Most of the statewide sport whitefish harvest occurs in the AYK Region. The Tanana Area sport harvest of whitefish is almost entirely from the Chatanika River, tributary to the Tolovana River, where an active spear fishery usually occurs in the fall, when whitefish make their way to upper sections of the Chatanika River to spawn.

#### **Fishery Description and Historical Perspective**

The spear fishery takes place during hours of darkness, and lanterns are used by those spearing fish to illuminate the water column and fish moving through it. Hook and line techniques are also used here and in other places to capture whitefish, in which small baited hooks are drifted along the stream bottom. The fall spearing fishery for whitefish proceeded at modest harvest levels until the mid-1980's. Harvest levels in the Tanana Area increased steadily during the 1981 to 1989 period, ranging from 5,449 fish in 1981 to 26,810 fish in 1986. From 1977 until 1987, harvest of whitefish from the Chatanika River increased at an average annual rate of 34%, the fastest growing sport fishery in the Tanana River drainage (Hallberg and Holmes 1987).

The Chatanika River supports spawning populations of humpback whitefish, least cisco, and round whitefish *Prosopium cylindraceum*. During late summer and fall, these fish migrate upstream from Minto Flats to spawn. By freeze-up in approximately mid-October, adult whitefish have departed for wintering areas that are as yet unidentified, and which may be located downstream of the Chatanika River. The importance of the Chatanika River as habitat for whitefish other than during spawning and the egg-fry development stages is not fully understood.

Prior to 1988, there was no bag limit imposed on the whitefish fishery in the Tanana River drainage, including the Chatanika River. As harvests of whitefish increased in the 1980's, concurrent with dramatic decreases in abundance, managers became concerned that whitefish stocks were being overfished. A bag limit of 15 fish was enacted in 1988. The new bag limit initially reduced the whitefish harvest to about one-third of the 1987 harvest. However, by 1989, the whitefish harvest had risen to 15,500 fish, and in 1990 the Department issued an emergency order to close the Chatanika River on October 11 to spear fishing due to low numbers of whitefish. The following year, 1991, spear fishing was closed on July 1 by emergency order, which resulted in only a minimum harvest of whitefish from the Chatanika River.

Spawning stocks of sheefish in the Tanana River drainage have been documented only in the upper Chatanika River (Alt 1987). Tagging studies from 1967 to 1971 indicated that sheefish that spawned in the Chatanika River also spent the summer feeding in Minto Flats (Alt 1987). Recaptures in the lower Chena River and at Nenana, of fish that were tagged in the Chatanika River, showed that sheefish disperse widely in the areas adjacent to spawning. Sheefish are widely distributed in the Tanana River drainage during the open water season, from the Tanana River mouth to more than 300 km upstream of Fairbanks. They have also been found at the mouths of the Bearpaw and Toklat rivers in the Kantishna River drainage. Typically sheefish are



taken in the lower reaches of clear water tributaries such as the Chena, Chatanika, Tolovana, and Tatalina rivers as well as others. In 1985, ADF&G stocked approximately 140,000 fingerling sheefish from a Yukon River stock into the Chatanika River in an effort to stimulate the sport fishery. Although the stocking program was generally believed to have failed, some increase in the sport harvest occurred in 1988. There have been no specific assessments of Tanana River drainage sheefish stocks, and little is known concerning status of any drainage stocks.

### **Recent Fishery Performance**

The estimated (SHS) 1991 harvest of Tanana Area whitefish was 739 fish, with none reported taken from the Chatanika River (Table 2). The harvest reduction is the result of reduced stock abundance and an early closure of the Chatanika River spear fishery on July 1 by emergency order. Total sport harvest of sheefish in the Tanana River drainage in 1991 was estimated to be 158 fish (Table 2). The whitefish harvest in 1992 was estimated at 3,246 for the entire Tanana River drainage, more than the previous year but greatly reduced from a recent historical perspective. The estimated sheefish harvest of 184 fish was in line with recent year harvests in the Tanana drainage.

### **Recent Board of Fisheries Action**

Since 1987 a daily bag limit of 15 whitefish for the waters of the Tanana River drainage has been in effect. At the time of their implementation, it was hoped that the new regulations would not only reduce harvest but also limit exploitation rates to no more than 20%, a level thought to be sustainable for these species. The reduced limit did not curb overfishing and after two seasons where emergency closures were implemented, the Alaska Board of Fisheries adopted a regulation in early 1992 that required the spear fishery to close on October 1. Hook and line fishing was not affected by the new regulation. In addition, a geographic restriction was enacted to limit the open area of the fishery to that portion of the river downstream of the Elliott Highway bridge, removing the upper portion of the drainage from the fishery.

### **Current Issues**

In 1992, staff perceived that there had been a lack of recruitment of humpback whitefish from 1985 and 1986, years when large harvests occurred on that species. Evidence of recruitment failure was that stock assessments indicated a large predominance of larger, older age fish. This fact, in addition to recent experience of reduced harvest and abundance made it questionable whether the stock could sustain a target fishery for spawning fish. It is hoped that the fishery will be sustainable at the new lower level created by the more restrictive regulations.

### **Ongoing Research and Management Activities**

Prior to 1992, estimates of whitefish abundance upon which the calculation of exploitation rates are based were restricted to a section of the Chatanika River near the location of the fishery, and consequently, estimates were not considered germane to the entire river and its stocks of whitefish (Timmons 1990). Abundance surveys were expanded in 1992 to include river areas downstream of the spear fishing area (Fleming 1993).

### **TANANA RIVER DRAINAGE RAINBOW TROUT**

Rainbow trout are not indigenous to the Yukon River drainage but have been introduced in several locations, including about 75 Tanana Area lakes since the 1950's.

### **Fishery Description and Historical Perspective**

There is evidence that successful natural reproduction has taken place in only one of the stocked locations, Fourteen Mile Lake, near Paxson. This landlocked lake, tributary to the Delta River, as last stocked in the 1960's by Federal Fishery Biologists, and there is evidence that young year classes are present (J. M. Burr, Alaska Department of Fish and Game, Fairbanks, personal communication).

Piledriver Slough has been stocked with rainbow trout since 1987. The slough was formerly connected to the Tanana River and is located about 30 km south of Fairbanks (Figure 2). Water in the slough became clear when the Army Corps of Engineers blocked Tanana River water from entering the upper end at several locations in 1976. The slough was blocked in conjunction with the Army Corps of Engineers Chena Flood Control Project to prevent spillage of high water discharge from the Tanana River into the floodway channel during construction. Temporary dikes remain, although they have not been maintained. Piledriver Slough, fed by groundwater from the Tanana River valley, re-established itself as a clear-water tributary to Moose Creek which discharges directly into the Tanana River. Arctic grayling, whitefish and long-nose suckers *Catostomus catostomus* were found inhabiting Piledriver Slough within a year after its upper end was blocked. The objective of stocking was to create a stream rainbow trout fishery in Alaska's interior, thus providing more diversity of fishing opportunity for Interior anglers. This was the first documented time rainbow trout had been released into flowing waters in interior Alaska since statehood.

Trophy rainbow trout (minimum size 6.8 kg, 15 lbs) have not been recorded from interior Alaska streams or lakes, and most of the registered trophy fish are native anadromous rainbow trout (steelhead) taken in coastal streams. Nevertheless, good growth rates and size have been achieved in some enhanced lake situations. The largest rainbow trout recorded in the Tanana Area was taken in 1980 from Quartz Lake at a size of 4.5 kg (9.8 lbs). Rainbow trout exceeding 2.3 kg (5 lbs) are commonly taken from area lakes.

### **Recent Fishery Performance**

The harvest of rainbow trout in Piledriver Slough by sport anglers in 1992 was estimated to be 5,454 fish, while approximately 37,500 rainbow trout were taken in the Tanana Area including Piledriver Slough (Table 16). Angler effort (number of days fishing) on Piledriver Slough in 1992 exceeded 13,600 days, the largest amount of effort for any single water body in the Tanana Area (Appendix D).

Substantial harvests of rainbow trout occur in Quartz, Birch, and Chena lakes. The largest harvest occurred in Quartz Lake, where an estimated 13,544 rainbow trout were taken (Table 16). The Tanana Area harvest of rainbow trout in 1988 of more than 78,000 fish represented an historical high value; the 1992 harvest estimate of 37,547 fish was about 52% smaller (Table 16).

### **Recent Board of Fisheries Action**

Prior to 1992 the daily bag and possession limit for rainbow trout in lakes of the Tanana River drainage was 10 fish, and two fish 20 inches and larger were allowed. The Board of Fisheries in 1992 adopted a regulation, proposed by the staff, to repeal the size limit and to increase the bag

**Table 16.-Sport harvest and catch<sup>a</sup> of stocked rainbow trout in the Tanana River drainage (1977-1992).**

	Year															
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>Harvest by Water Body:</b>																
Birch Lake	1,850	5,126	4,190	18,727	21,622	18,385	16,963	12,123	10,161	8,723	9,981	18,390	16,420	15,901	17,625	8,312
Quartz Lake	2,634	512	273	129	1,869	5,003	1,574	5,491	12,398	14,778	10,106	25,175	27,356	20,847	28,238	13,544
Chena Lakes	NR	NR	NR	NR	NR	NR	294	12,032	9,660	7,001	5,220	9,877	11,968	8,558	12,196	3,602
Bluff Cabin Lake	NR	NR	NR	NR	NR	NR	105	39	NR	NR	411	346	999	810	105	427
Donna Lake	NR	NR	NR	NR	NR	NR	63	NR	NR	48	209	1,743	630	506	92	119
Donnelly Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	182	NR	NR	77	119
Eielson AFB Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	164	261	NR	154	103
Four Mile Lake	NR	NR	NR	NR	NR	NR	10	39	NR	96	174	1,110	478	118	123	111
Bathing Beauty Pond	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	36	43	84	NR	396
Harding Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	118	73	456	354	246	1,385
Jan Lake	NR	NR	NR	NR	NR	NR	NR	52	NR	NR	501	1,019	185	810	523	887
Koole Lake	NR	NR	NR	NR	NR	NR	608	26	312	NR	167	200	1,358	574	461	87
Mark Lake	NR	NR	NR	NR	NR	NR	NR	1,610	NR	80	NR	NR	22	979	NR	NR
Lisa Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	56	104	491	174	84	231	87
Little Harding Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Monte Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Robertson Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	327	391	NR	NR	32
Sansing lake	NR	NR	NR	NR	NR	NR	304	1,571	260	72	118	1,073	152	506	1,092	119
Twin Lake	NR	NR	NR	NR	NR	NR	NR	26	277	56	7	1,423	NR	1,367	NR	16
Piledriver Slough	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	4,346	12,296	7,689	8,052	6,352	5,454
Steese Ponds	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	123	40
CHS Road Ponds	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	109	NR	NR	954	127
Dune Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	80	42	236	1,705	591	646	166
Bullwinkle Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	11	NR	246	NR
Rainbow Lake	NR	NR	NR	NR	NR	NR	21	26	243	128	NR	509	109	NR	31	NR
Lost Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	182	NR	NR	NR	16
Hidden Lake	NR	NR	NR	NR	NR	NR	NR	39	NR	NR	NR	546	NR	203	15	47
Meadow Road Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1,107	989
Coal Mine Road Lks	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	11	118	477	356
Other Lake	1,508	768	723	728	1,080	2,790	559	948	121	152	320	4,221	4,257	3,681	910	1,006
<b>Total</b>	<b>5,992</b>	<b>6,406</b>	<b>5,186</b>	<b>19,584</b>	<b>24,571</b>	<b>26,178</b>	<b>20,616</b>	<b>34,022</b>	<b>33,432</b>	<b>31,270</b>	<b>31,824</b>	<b>78,345</b>	<b>74,675</b>	<b>64,143</b>	<b>72,024</b>	<b>37,547</b>

-continued-

Table 16.-Page 2 of 2.

	Year															
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>Harvest by Water Body:</b>																
<b>Catch<sup>a</sup></b>																
Birch Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	34,705	35,512	19,726
Quartz Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	47,568	44,679	30,294
Chena Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	23,075	22,055	9,618
Harding Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1,182	277	3,253
Koole Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	912	NR	NR
Piledriver Slough	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	23,818	18,134	18,404
Steese Ponds	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	800	237
CHS Road Ponds	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1,784	269
Dune Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2,144	1,230	2,304
Meadow Road Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	3,168	2,755
Coal Mine Road Lks	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	907	752
Other Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	21,591	7,799	8,590
Total	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	154,995	136,345	96,202

<sup>a</sup> Information available from 1990-1992 only. Anglers may have harvested or released fish tallied as “catch”.

NR = no harvest or catch reported.

and possession limit to 10 fish in all waters of the drainage. The reason that the Board took these actions was staff testimony that indicated little concern for the conservation of the species since it survives only by repeated stocking events. The size limit was repealed because so few trout actually reach a size of 20 inches.

### **Current Issues**

As explained in the section on Chena River Arctic grayling, there is local interest in stocking fertile rainbow trout into local streams as a means to provide fishing for this species in more flowing waters than are currently available.

### **Ongoing Research and Management Activities**

No activities were targeted to this species only in 1992. Comparative catches of stocked and resident species in Harding Lake (Skaugstad 1993b) indicated that rainbow trout that had been stocked into that lake were no longer available to the test nets. It was concluded that rainbow trout were unable to compete and survive in Harding Lake. Stocks of both Arctic grayling and rainbow trout in Piledriver Slough were assessed by Fleming and Schisler (1993).

## **AYK AREA SPORT FISHERIES**

Described below in some detail are the sport fisheries for the area that staff believe to be the most important. Several of the minor fisheries in terms of effort and harvest are discussed jointly at the end of the section.

## **YUKON RIVER DRAINAGE SALMON**

Chinook, chum and coho salmon are important subsistence and commercial species in the Yukon River drainage. Their utilization by sport anglers has, to date, been minimal.

### **Fishery Description and Historical Perspective**

Chinook salmon spawn throughout the Yukon River drainage. Chum salmon, including a summer run and a fall run are numerically the most abundant species, and are distributed throughout the drainage as well. Coho salmon are less abundant and spawn in large numbers in only few identified streams. Pink salmon are locally abundant in some years but do not migrate upstream of the

Anvik River probably. Sockeye salmon occur occasionally, but only a few individuals are taken annually in commercial or subsistence harvests. There may be a small spawning stock of this species in the Innoko River, but the exact location of spawning has not been identified.

Annual sport harvests of Yukon River drainage salmon have historically been, and continue to be primarily from streams of the Tanana River drainage. Mills (1977-1993) and Arvey and Mills (1993) report sport harvests from other streams and drainages in the Yukon watershed, primarily from the Andreafsky, Anvik, Porcupine and Koyukuk rivers and their drainages (Table 17). Approximately 12,000 people live along the Yukon River and its tributaries (excluding the Tanana River). Most of these people depend on salmon for either livelihood, subsistence, or both. However, sport fishing for salmon is seldom practiced by rural residents compared to the more customary methods such as gill net and fish wheel, where a larger volume harvest can be taken in the turbid mainstem of Yukon River. Rod and reel fishing for salmon is practiced by some rural residents on occasion and by non-area residents who visit for the purpose of sport fishing.

**Table 17.-Sport harvest of salmon in the Yukon River drainage (1977-1992).**

	Year																All Years
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
Harvest of Chinook Salmon by tributary:																	
Koyukuk River	NR	NR	NR	NR	NR	NR	NR	13	NR	NR	NR	NR	NR	NR	20	NR	33
Porcupine River	NR	NR	NR	NR	NR	NR	NR	NR	12	NR	NR	NR	10	NR	10	39	71
Andreafsky River	NR	104	NR	15	NR	NR	NR	NR	NR	NR	NR	NR	40	NR	31	08	198
Innoko River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	10	NR	NR	NR	10
Anvik River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	18	30	01	31	94	174
Nulato River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Melozitna River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nowitna River	NR	NR	NR	NR	NR	11	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	11
Dall River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chandalar River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Charley River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fortymile River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Other above Tanana	NR	NR	NR	NR	NR	NR	NR	NR	NR	15	NR	NR	NR	NR	NR	94	109
Other below Tanana	NR	244	39	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	01	31	NR	315
Yukon drainage Lks	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Other Yukon River	52	12	NR	NR	6	11	NR	NR	NR	NR	NR	73	NR	105	20	62	341
Total	52	260	39	15	6	22	NR	13	12	15	NR	91	90	107	243	279	1,262
Harvest of Chum Salmon by tributary:																	
Koyukuk River	NR	NR	NR	NR	NR	NR	297	NR	NR	NR	124	NR	10	NR	NR	23	454
Porcupine River	NR	NR	NR	NR	NR	21	NR	NR	12	NR	NR	NR	NR	13	NR	08	54
Andreafsky River	NR	273	NR	NR	NR	NR	42	NR	NR	NR	35	NR	103	76	31	02	562
Innoko River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	21	NR	NR	NR	21
Anvik River	02	NR	NR	NR	NR	37	NR	NR	NR	NR	NR	18	206	101	188	NR	552
Nulato River	06	NR	NR	NR	NR	NR	NR	NR	NR	NR	25	NR	31	25	NR	137	224
Melozitna River	NR	NR	NR	NR	NR	24	NR	NR	NR	NR	NR	NR	NR	NR	NR	15	39
Nowitna River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Dall River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	21	NR
Chandalar River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Charley River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fortymile River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Other above Tanana	06	20	NR	NR	06	NR	NR	NR	NR	92	NR	NR	NR	NR	NR	84	208
Other below Tanana	NR	NR	109	NR	NR	NR	10	NR	NR	NR	42	NR	NR	126	209	114	610
Yukon drainage Lks	03	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	21	NR	NR	NR	24
Other Yukon R.	NR	NR	NR	NR	11	NR	NR	NR	NR	110	NR	73	577	76	NR	229	1,076
Total	17	293	109	NR	17	82	349	NR	12	202	226	91	969	417	449	612	3,845

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Table 17.-Page 2 of 2.

	Year																All Years
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	
Harvest of Coho Salmon by tributary:																	
Koyukuk River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	25	NR	40	NR	89	NR	154
Porcupine River	NR	NR	NR	NR	NR	NR	NR	NR	12	NR	NR	NR	NR	NR	NR	81	93
Andreafsky River	18	100	NR	NR	NR	NR	NR	NR	NR	NR	36	73	110	206	237	235	1,015
Innoko River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	89	NR	89
Anvik River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	55	NR	22	15	NR	92
Nulato River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Melozitna River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Nowitna River	NR	NR	NR	NR	NR	45	NR	NR	NR	NR	NR	NR	NR	NR	NR	49	94
Dall River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chandalar River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Charley River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Fortymile River	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Other above Tanana	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Other below Tanana	NR	63	25	NR	NR	NR	NR	NR	NR	73	NR	NR	NR	NR	NR	162	323
Yukon drainage Lks	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Other Yukon R.	NR	NR	NR	NR	NR	NR	52	NR	NR	88	NR	55	30	NR	NR	24	249
Total	18	163	25	NR	NR	45	52	NR	12	161	61	183	180	228	430	551	2,109

NR = No harvest or catch reported.

Consequently, size of reported sport harvest do not reflect the abundance of salmon in the drainage.

### **Recent Fisheries Performance**

Estimated sport harvests of the three principal species of salmon, 279 chinook, 612 chum and 551 coho salmon, were larger in 1992 than have been reported in any prior year (Table 17). Even so, the sport harvest of salmon of all species is extremely light for a drainage as large and productive as the Yukon.

### **Recent Board of Fisheries Action**

The most recent regulation changes for salmon sport fishing occurred in 1987 when current bag and possession limits (Appendix C) were established throughout the drainage.

### **Current Issues**

No issues are identified at this time.

### **Ongoing Research and Management Activities**

No active research or management is taking place or planned because of the minor nature of the salmon sport fishery in the Yukon River drainage.

## **UPPER KUSKOKWIM RIVER SALMON**

As described previously, sport fishing for salmon and other species upstream of the Aniak River confluence has historically been very limited.

### **Fishery Description and Historical Perspective**

In the 16 year database of harvest estimates (Mills 1977-1993) from this area, a combined total harvest of only 14,000 chinook, chum or coho salmon is estimated (Table 18). Typically, there is little sport effort or harvest for any of the species. Most salmon fishing is conducted under commercial and subsistence regulations by local residents in the Kuskokwim River drainage. Sport fishing is conducted by persons visiting the area on guided and sometimes personal fishing trips, or as sidelights to hunting activity in the fall. More salmon harvest was estimated during the period from 1980 to 1983, although total numbers of fish estimated are low in all years relative to other active salmon sport fisheries in less remote areas of the state.

Chinook salmon was the mainstay of the commercial and subsistence fisheries of the Kuskokwim River until the mid-1980's when escapements dropped below levels believed necessary to sustain recent harvest levels. Various harvest restrictions on the commercial fishery since 1985, coupled with apparent increases in stock productivity reversed the trends of declining escapement, but the target commercial fishery for chinook salmon has been largely eliminated, leaving the subsistence fishery as the largest-volume fishery for the species. However, substantial numbers of chinook are still harvested in the commercial fishery. Recent estimates of the subsistence harvest for chinook salmon range from 70,000 to 80,000 fish in the Kuskokwim River in 1990 and 1991. Estimated total utilization of chinook salmon in 1990 and 1991 was approximately 125,000 and 119,000 in 1990 and 1991. Similar totals for 1992 are estimated at approximately 105,000 chinook salmon (Francisco et al. 1993).

Coho salmon are distributed widely south of the Brooks Range in the AYK Area, however, they are more abundant in the Kuskokwim River drainage and in drainages to the south than in



**Table 18.-Sport harvest of principal species in the upper Kuskokwim River drainage (1977-1992).**

	Year																Average
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	All Years
<b>Harvest from the Holitna River</b>																	
Chinook Salmon	09	71	NR	NR	NR	74	231	78	12	NR	42	18	156	NR	NR	23	45
Chum Salmon	07	NR	NR	NR	NR	183	514	26	50	NR	42	NR	NR	14	119	91	65
Sockeye Salmon	14	NR	NR	NR	NR	10	NR	NR	50	NR	21	NR	NR	NR	NR	NR	06
Coho Salmon	19	NR	NR	NR	08	753	483	91	100	24	145	91	NR	12	205	130	129
Arctic grayling	180	45	08	NR	160	123	1,353	65	NR	24	543	73	128	18	312	23	191
Northern Pike	42	109	22	NR	NR	522	535	26	69	NR	97	528	82	53	504	145	171
Sheefish	16	109	NR	NR	NR	22	535	26	35	NR	217	36	90	53	128	173	90
Arctic Char	277	45	09	NR	44	325	73	NR	NR	24	147	36	50	18	216	NR	79
<b>Harvest from other streams</b>																	
Chinook Salmon	51	81	68	97	869	402	189	26	49	NR	21	NR	156	41	NR	55	132
Chum Salmon	118	117	173	165	916	756	220	52	NR	NR	56	NR	NR	202	NR	38	176
Sockeye Salmon	52	71	48	NR	111	219	206	NR	NR	NR	126	127	11	12	NR	24	63
Coho Salmon	253	289	388	512	327	423	NR	455	24	269	254	182	112	109	276	315	262
Arctic grayling	1,992	1,908	3,801	4,440	3,769	4,609	4,061	1,545	503	318	870	1,275	583	300	664	121	1,922
Northern Pike	750	273	1,480	2,050	1,610	1,054	451	584	243	NR	258	1,182	584	18	1,009	60	725
Sheefish	108	36	283	134	287	343	157	182	105	48	91	528	180	NR	13	NR	156
Arctic Char	1,219	406	569	368	1,192	2,060	1,164	260	NR	24	NR	200	88	18	58	98	483
<b>Harvest from Lakes</b>																	
Chinook Salmon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chum Salmon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Sockeye Salmon	NR	NR	NR	NR	NR	NR	41	NR	NR	98	NR	NR	NR	NR	NR	33	11
Coho Salmon	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Arctic grayling	NR	NR	919	NR	NR	152	115	52	NR	49	NR	NR	NR	335	NR	38	104
Northern Pike	NR	NR	NR	NR	35	67	650	78	NR	NR	NR	273	175	NR	33	153	92
Sheefish	NR	NR	NR	NR	NR	NR	63	NR	NR	NR	NR	NR	NR	NR	NR	NR	04
Arctic Char	NR	NR	NR	NR	NR	NR	125	65	NR	NR	NR	NR	25	NR	86	16	20
<b>Total</b>	5,107	3,560	7,768	7,766	9,328	12,097	11,166	3,611	1,240	878	2,930	4,549	2,420	1,203	3,623	1,536	4,926

NR = No reported harvest.

drainages north of the Kuskokwim River. Returns of coho salmon to the Kuskokwim River may be the largest to a single river in Alaska. Approximately 660,000 coho salmon were harvested in the 1986 Kuskokwim River commercial fishery, historically the largest commercial harvest for this system (Francisco et al. 1987). Western Alaska coho salmon are thought to spawn primarily in spring-fed portions of streams. The upper Kuskokwim River and its tributaries that drain the northern slopes of the Alaska Range are extensively underlain with alluvial gravels as a result of outwash from the Alaska Range. The resulting gravel aquifers provide high quality spring water for spawning and rearing of coho salmon in the Kuskokwim drainage.

### **Recent Fisheries Performance**

Sport harvest of all salmon species in the upper Kuskokwim River in 1991 and 1992 continued to be very light for all species, conforming generally to the historic pattern. Coho salmon harvests were larger than those for other salmon species in both years.

### **Recent Board of Fisheries Action**

Most recent action for the salmon sport fishery in the area was taken by the Board of Fisheries in 1987. Regulations in place in 1992 are presented in Appendix C.

### **Current Issues**

Bag and possession limits for chinook salmon were revised downward to one per day in 1987 when status of local stocks of chinook was unquestionably depressed and maintenance of historic escapement levels was threatened. Since 1987, total utilization of chinook and escapements have stabilized at higher levels and it may be appropriate to examine whether revision of bag and possession limits upwards to the levels enjoyed by other healthy chinook stocks in the Region, three per day with only two larger than 28 inches in length.

### **Ongoing Research and Management Activities**

There are no current or planned activities for salmon in this area.

## **YUKON RIVER ARCTIC GRAYLING**

Grayling are an extensively distributed resident freshwater species that occurs from the Yukon Delta, upstream to extreme headwater streams. It is a prized species for anglers because of its feeding characteristics, pleasing appearance and food qualities.

### **Fishery Description and Historical Perspective**

Grayling are distributed throughout the entire drainage, from extreme headwaters in Canada to streams that originate in the Yukon Delta. Sport fishing effort is likewise widespread and diverse, but historic documentation of harvests (Mills 1977-1993) indicates that the heaviest sport utilization has occurred on Koyukuk River tributaries, primarily those that are crossed by the Dalton Highway. A large proportion of the reported harvests from the Koyukuk River drainage were taken near road crossings of such tributaries as Jim River, Fish Creek, Bonanza Creek, South Fork of the Koyukuk River as well as others.

Virtually all other grayling harvests in the drainage are from streams that have no, or very limited, road access. Historic sport effort and harvests are estimated to be small relative to road accessible streams (Table 19).

**Table 19.- Sport harvest of Arctic grayling in the Yukon River drainage (1977-1992).**

	Year																Average
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	All Years
<b>Harvest of the Arctic grayling by tributary</b>																	
Koyukuk River	169	208	1,053	3,598	1,521	1,726	4,808	4,544	2,099	3,773	6,911	3,439	3,674	2,827	1,685	1,001	2,690
Porcupine River	NR	353	2,853	3,207	616	1,084	93	104	346	92	NR	NR	187	203	1,337	180	666
Andreafsky River	76	985	45	521	NR	114	136	NR	NR	122	209	NR	73	169	193	38	168
Innoko River	55	NR	76	NR	287	NR	10	NR	NR	NR	NR	NR	166	NR	NR	NR	37
Anvik River	117	NR	115	44	NR	NR	NR	NR	NR	NR	NR	910	21	NR	154	143	94
Nulato River	53	162	44	NR	NR	95	NR	52	NR	NR	297	NR	167	NR	26	68	60
Melozitna River	11	45	57	211	32	48	42	195	NR	NR	NR	NR	354	17	129	68	76
Nowitna River	92	18	NR	NR	NR	285	84	NR	104	NR	NR	NR	NR	NR	77	84	47
Dall River	NR	NR	64	NR	96	29	NR	NR	NR	NR	NR	NR	NR	NR	129	15	21
Chandalar River	14	235	64	86	432	347	483	NR	NR	107	NR	218	31	592	257	353	201
Charley River	326	18	NR	NR	64	171	157	NR	347	NR	92	36	125	17	129	383	117
Fortymile River	193	81	392	35	365	286	609	91	121	45	13	73	83	119	218	347	192
Other above Tanana	597	226	1,034	451	249	343	241	961	174	1,070	66	729	760	357	309	737	519
Other below Tanana	97	543	189	150	185	209	975	1,389	486	111	278	200	NR	17	372	61	329
Yukon drain. Lakes	374	262	864	516	205	330	689	766	538	259	124	364	833	322	244	38	421
Other Yukon R.	311	841	1,425	816	2,124	2,103	274	104	243	76	1,064	182	1,009	321	335	535	735
<b>Total</b>	<b>2,485</b>	<b>3,977</b>	<b>8,275</b>	<b>9,635</b>	<b>6,176</b>	<b>7,170</b>	<b>8,601</b>	<b>8,206</b>	<b>4,458</b>	<b>5,655</b>	<b>9,054</b>	<b>6,151</b>	<b>7,483</b>	<b>4,961</b>	<b>5,594</b>	<b>4,051</b>	<b>6,373</b>

NR = No reported harvest.

### **Recent Fishery Performance**

Harvest estimates in 1990, 1991 and 1992 (Table 19) were below the 16-year mean for the drainage (6,373 fish). The 1992 harvest estimate was low compared to the long-term average, especially in the Koyukuk River drainage.

### **Recent Board of Fisheries Action**

Most recent action for the grayling sport fishery in the Yukon River drainage was taken by the Board of Fisheries in 1987. Regulations in place in 1992 are presented in Appendix C.

### **Current Issues**

Local roadside depletion of fish stocks near crossings of Koyukuk River tributaries by the Dalton Highway are of concern, since such depletions reduce angling opportunity for sport fishers traveling the route. Current bag and possession limits of 10 fish per day should probably be reduced to alleviate harvest pressure in the immediate road crossing areas.

### **Ongoing Research and Management Activities**

There are no current or planned activities for grayling in this area.

## **KUSKOKWIM RIVER DRAINAGE ARCTIC GRAYLING**

As in the Yukon River drainage, the species is widespread. A portion of its range in the Kuskokwim River drainage from Aniak downstream is shared with rainbow trout.

### **Fishery Description and Historical Perspective**

Local rural residents of the upper Kuskokwim River communities and occasional visitors from outside are the primary participants in this sport fishery. Mean annual sport harvest since 1977 is about 2,000 grayling (Table 18) from this area.

This represents a low effort, low harvest, remote fishery that is almost entirely inaccessible by road. Fishing is typically conducted in small to medium size tributaries of the main Kuskokwim River or one of its major branches.

Since 1977 the largest estimated annual harvests occurred in 1982 and 1983 when approximately 5,000 grayling were taken.

### **Recent Fishery Performance**

Harvest estimates for the most recent years, 1989-1992 (Table 18) are significantly lower than those for many prior years, and well below the annual mean harvest.

### **Recent Board of Fisheries Action**

Very liberal fishing regulations are in place for the area in recognition of its remoteness and lack of sport fishing effort. There have been no recent actions by the Board of Fisheries for the fishery.

### **Current Issues**

No current issues are identified.

### **Ongoing Research and Management Activities**

There are no current or planned activities for grayling in this area.

## **NORTH SLOPE ARCTIC GRAYLING AND DOLLY VARDEN**

Most of the freshwater drainages that have been surveyed along the Arctic coast contain Arctic grayling (USFWS 1982).

### **Fishery Description and Historical Perspective**

Alaska's North Slope (Figures 16 and 17) extends approximately 1,050 km from the Lisburne Peninsula along the Chukchi Sea, eastward to the Canadian border near Demarcation Point.

Sport fishing effort is light, ranging from 1,400 to 8,300 angler-days from 1977 to 1992 (Mills 1977-1993; Table 20). Most streams and lakes receive little or no sport fishing pressure, while a few receive more use because of proximity to human settlements or industrial sites, because they are target destinations for guides and their clients, or because they are easily accessible from the Dalton Highway. Combined effects of rugged climate, short summers, and generally limited access in the area will likely act to discourage expansion of the sport fishery beyond current modest levels.

Arctic grayling are the most commonly harvested species, followed by Dolly Varden and/or Arctic char. The average annual harvest of Arctic grayling from 1977 to 1991 (15 years) was approximately 2,500 fish, with the largest harvest of about 5,500 fish in 1985 (Table 20). The mean annual harvest of Dolly Varden or Arctic char over the same period has been about 1,300 fish, with a peak in 1985 of about 3,500 fish.

### **Recent Fishery Performance**

Estimated harvests of both species in 1992 were below the long-term mean in spite of the fact that effort was about 15% more than average (Table 20).

### **Recent Board of Fisheries Action**

The most recent action taken by the Board occurred in 1992, when the bag limit of large Dolly Varden/Arctic char was reduced to only two equal to, or exceeding 20 inches in length. Therefore the daily bag and possession limit is 10 fish, only two of which may equal or exceed 20 inches in total length.

### **Current Issues**

There is a concern among native people of the North Slope that a growing sport fishery may conflict with local subsistence fisheries for the same species.

### **Ongoing Research and Management Activities**

There are no current or planned activities for grayling or Dolly Varden in this area.

## **OTHER AYK AREA SPORT FISHERIES**

Following are brief descriptions of sport fisheries in the AYK Area that are smaller and less well documented than those described in the foregoing section.

### **Lake Trout**

Burr (1987) described the distribution of lake trout in Alaska. Lake trout are most frequently associated with deep, oligotrophic lakes in the mountains and are rarely found at lower elevations of the Yukon or Kuskokwim basins (Redick 1967; Morrow 1980). Lake trout occur in lakes and streams of the Brooks Range in the Noatak and Kobuk River drainages, and in most drainages that flow into the Yukon River from the Brooks Range. Lake trout distribution is primarily

**Table 20.-Sport fishing effort and harvest of Arctic grayling and Dolly Varden/Arctic char in waters of Alaska's North Slope.**

Year	Effort Angler-Days	Harvest	
		Arctic grayling	Dolly Varden/ Arctic char
1977	2,434	1,239	241
1978	1,422	678	181
1979	1,526	1,373	364
1980	2,142	1,765	801
1981	2,601	2,908	1,188
1982	4,879	4,077	2,065
1983	5,619	2,568	2,966
1984	8,344	2,441	1,507
1985	4,490	5,382	3,489
1986	4,779	4,099	983
1987	5,256	1,932	2,676
1988	2,541	983	1,018
1989	4,118	2,113	1,031
1990	3,764	791	489
1991	7,291	3,301	1,199
1992	4,940	1,145	836
Mean	4,134	2,300	1,315

restricted to lakes at higher elevations in these drainages. Lake trout are widely distributed on the north slope of the Brooks Range. They occur most frequently in mountain and foothill lakes, but they also occur in streams of the Colville, Sagavanirktok, and Canning River drainages. With one notable exception, lake trout generally do not occur in the lowland lakes of the Arctic coastal plain, but are common in central coastal plain lakes between the Ikpikpuk and Colville rivers. They occur in Teshekpuk Lake, an immense lake (810 km<sup>2</sup>, Philo and Moulton 1993) in the Arctic coastal plain, about 100 km southeast of Barrow.

Harvest in 1992 for the AYK Area totaled 1,198 fish (Table 3). Harvests for the AYK Area since 1977 have ranged from about 800 fish in 1977 to about 2,500 in 1986 (Table 3).

Studies conducted by ADF&G indicate that lake trout resources have been overharvested in many of the more accessible waters of south-central and interior Alaska. Specific life history features (slow growth, delayed maturity, and non-consecutive spawning) combined with the short growing season at higher latitudes and altitudes increases the vulnerability of the species to overharvest.

### **Northern Pike**

Sloughs, interconnected lakes, and the lower sections of large rivers throughout most of the AYK Area are inhabited by northern pike. Lowland areas of the Yukon and Kuskokwim rivers are particularly noted for large northern pike. Northern pike are abundant in all parts of the AYK Area containing appropriate habitat except on the north slope of the Brooks Range, where distribution is limited. Bendock and Burr (1985) reported the presence of northern pike in the Ikpikpuk River on the Arctic coastal plain west of the Colville River, (Figure 16) and in middle reaches of the Killik River, tributary to the Colville River.

During summer, northern pike are generally distributed near shore in shallow water containing aquatic vegetation and a mud bottom. Northern pike have some tolerance for salinity and they are taken frequently in brackish waters of the Yukon-Kuskokwim Delta. They are not known to feed or travel extensively in marine or coastal waters outside the major rivers. During winter, northern pike congregate in deep, well-oxygenated waters found in the lower reaches of tributaries or other areas of sufficient water flow (Hallberg 1984).

Most of the sport harvest of northern pike is taken with hook and line. Spearing, bow and arrow, and hand jigging techniques are also legal means and account for a small proportion of the total harvest. Northern pike sport fishing occurs in the Kuskokwim River drainage from McGrath to downstream of Bethel, including the Takotna, Nixon Fork, Holitna, and Johnson rivers. Most sport fishing for northern pike along the Yukon River takes place upstream from Galena. Popular areas include the Yukon Flats near Fort Yukon, Koyukuk River, Beaver Creek, Birch Creek, Dall River, Hess Creek, Tozitna River, Melozitna River, and Nowitna River.

Much of the sport and some of the subsistence harvest in the AYK Area is taken during winter months through the ice with hook and line gear. Sport fishing for northern pike has gained in popularity since the early 1960's. Northern pike are eagerly sought by fishermen in areas that have good boat access. They are often fished in the fall in combination with hunting activities.

The estimated sport harvest of northern pike in the AYK Area (exclusive of Seward Peninsula/Norton Sound and Northwest Alaska sub-areas) has ranged from about 1,600 fish in 1977 to more than 6,500 fish in 1983 (Mills 1979-1993). The estimated harvest in 1992 was 4,342 fish (Table 3 includes harvest from the Northwestern Alaska sub-area). Generally, the

largest harvests have been taken in the Yukon and Kuskokwim river sub-areas. Estimated 1991 harvests from these sub-areas were 3,590 and 752 northern pike respectively.

Little is known concerning the status of northern pike stocks in the AYK Area, but because of remoteness and restricted access, fishing effort is light except on those stocks near towns and villages where angling and subsistence gill netting effort may be more intense. Northern pike populations close to the Yukon River Haul Road Bridge have experienced more angling pressure because the recent opening of the road has allowed easy boat access for Fairbanks area residents. Studies of pike in the vicinity of the Yukon River bridge (Arvey and DeCicco 1989; Arvey and Burkholder 1990) suggested that annual harvests in the Dall River were sustainable. Northern pike population studies conducted in the Tanana River drainage suggest that abundance and stock composition parameters such as age and size composition respond negatively and rapidly when annual harvest exploitation rates exceed 16%.

### **River and Lake Burbot**

Burbot are distributed throughout the AYK Area in all major rivers and many of the lakes and minor waterways. It is an important fisheries resource for subsistence economies of rural Alaska and for sport fisheries as well. Burbot are members of the cod family, *Gadidae*, and spawn in midwinter under the ice of rivers and lakes. Sport fishing interest and intensity has increased for the species in recent years, particularly near settlements where burbot fishing provides an outdoor wintertime activity for many people. Reported annual sport harvests of burbot in the AYK Area since 1978 have ranged from just over 100 fish to approximately 1,900 fish (Table 3). The majority of the harvest and fishing effort occurs in the winter with lines set through the ice, although hand-held lines with rod and reel are also used in summer and winter months. The estimated AYK Area harvest of burbot in 1992 was 616 fish (Table 3 Note: Table 3 includes small harvests in Northwest Alaska).

Only six of the 196 Alaska trophy burbot registered from 1967 to 1992 were taken in the AYK Area (inclusive of Seward Peninsula/Norton Sound and Northwest Alaska sub-areas) a fact that no doubt reflects lack of sport fishing effort in much of the area.

### **Sheefish**

Sheefish are large, predatory whitefish found throughout western, interior, and northwestern Alaska. They do not occur in streams of the North Slope nor in Norton Sound north of the Koyuk River. Alt (1987) recognized nine stocks of sheefish, with anadromous-estuarine stocks occurring in the Kuskokwim, lower Yukon, Koyuk, Kobuk-Selawik rivers, and resident non-anadromous stocks in Yukon River tributaries of the Nowitna, Tanana River (Minto Flats), Porcupine, and Salmon Fork of the Black River, as well as the main stem of the upper Yukon River. The distribution of this species in Alaska is limited to the AYK Region. A discussion of the stocks resident to Northwest Alaska is found elsewhere in this report.

Sheefish are harvested by subsistence, commercial, and sport users with subsistence harvests exceeding all others. During the period from 1978-1992, estimates of the sport harvest in the Yukon and Kuskokwim rivers ranged from less than 300 fish to about 1,500 fish. The harvest estimate for these rivers in 1992 was 845 sheefish (Mills 1993). Alt (1975 and 1977) reported that the most abundant stocks of sheefish in Alaska occur in the lower Yukon River, Koyukuk River, and in the mainstem middle Yukon River, and that these Yukon River stocks make the longest migrations of any sheefish in Alaska.



Sheefish generally overwinter in lower reaches of rivers and in estuarine waters, migrate upstream in summer to feeding grounds, and migrate further upstream to spawning grounds in the late summer and fall. Migrations of over 1,650 km have been documented. It is not certain that spawning grounds have been identified for all major sheefish stocks.

## **NORTHWEST ALASKA SPORT FISHERIES**

Waters of the area offer some of the most remote and diverse angling opportunities available in Alaska. Trophy fish opportunities for Dolly Varden, sheefish and Arctic grayling are well known among sport fishers in Alaska and many fishing trips are planned to try for large individuals of these species. Angling for salmon, especially chinook and coho is not as well known, but can be excellent seasonally in several streams that produce good runs. Marine sport fisheries, with the exception of local effort for king crab near Nome, are practically non-existent. Through the ice fisheries for saffron cod, flounder, sheefish, and other species using hook and line are common throughout the area near settlements, but these fisheries operate under subsistence fishing regulations.

## **NORTHWESTERN ALASKA SALMON**

### **Fishery Description and Historical Perspective**

Guided and nonguided sport fishing for salmon takes place throughout the area with concentrations near Unalakleet, and in waters accessible from the Nome area road system. Some fishing effort occurs in association with wilderness float trips popular in Kotzebue Sound drainages, but the amount of sport fishing effort expended toward salmon in the northern part of the management area is generally light.

Total fishing effort estimated to have occurred for all species of fish ranged from about 11,000 angler-days in 1977 to 33,000 angler-days in 1991 (Table 21). Salmon harvest is estimated to have ranged from 3,770 fish in 1977 to 18,308 fish in 1984. Calculated annual harvest of salmon of all species from 1984 to 1992 is 10,591 fish, with 97% of the harvest reported from Seward Peninsula and Norton Sound, and about 3.0% from Kotzebue drainages (means calculated from Table 21). About 40% of the total average harvest has been coho salmon, 37% pink salmon, 15% chum salmon, and 5% chinook salmon. During years of high pink salmon abundance such as 1978, 1980, 1982, 1984 and 1992, harvests of this species have comprised 70% to 80% of the total annual salmon harvest.

The Unalakleet River supports substantial runs of all salmon species except sockeye. Guided and nonguided fishing effort is primarily focused on chinook and coho salmon, but chum and pink salmon are also harvested. There is one commercial sport fishing lodge located on the river which hosts around 200 to 250 visiting anglers each year. Several local residents also guide anglers on the river. Guided anglers comprise about half of the total fishing effort, but the salmon harvest from this component of the fishery is quite low. During 1989, guided anglers caught more than 8,000 salmon in the Unalakleet River but killed less than 10% of these fish. Of the salmon killed, about 12% were chinook and 73% were coho. The average annual sport harvest of salmon of all species from the Unalakleet River from 1983 to 1991 has been about 2,600 fish. Coho comprised about half the average harvest while chinook made up less than 10% (Mills 1984-1993).

Nine rivers accessible from the road system in the Nome area sustain some level of sport fishing effort for salmon. Estimated harvests from these rivers have averaged about 7,800 salmon

**Table 21.-Sport fishing effort\* and harvests (catches for 1990-1992) of salmon in Seward Peninsula/Norton Sound, and northwestern Alaska 1977-1992.**

<b>Seward Peninsula/Norton Sound:</b>							
<b>Year</b>	<b>Number of Anglers</b>	<b>Effort in Angler Days</b>	<b>Chinook Harvest (Catch)</b>	<b>Coho Harvest (Catch)</b>	<b>Chum Harvest (Catch)</b>	<b>Pink Harvest (Catch)</b>	<b>Sockeye Harvest (Catch)</b>
1977		7,828	197	449	670	2,402	0
1978		8,379	303	742	546	7,399	0
1979							
1980		7,968	52	1,455	1,601	7,732	0
1981		10,879	70	1,504	1,889	3,101	0
1982		13,198	409	2,986	2,620	13,742	0
1983		16,944	687	3,823	2,042	4,583	0
1984	2,512	17,436	247	7,582	1,481	8,322	351
1985	3,399	19,919	239	1,177	1,036	1,138	20
1986	3,381	18,107	1,077	3,926	1,719	3,172	19
1987	2,679	21,413	615	2,319	814	1,304	924
1988	3,001	20,278	400	5,038	1,583	2,912	782
1989	3,052	17,692	203	4,158	1,497	3,564	165
1990	3,233	21,799	364	3,305	925	7,647	198
			(467)	(6,397)	(3,044)	(14,532)	(256)
1991	3,776	23,622	404	5,800	1,415	1,738	237
			(512)	(8,810)	(2,380)	(3,993)	(498)
1992	3,540	22,684	204	4,671	523	6,403	131
			(570)	(8,415)	(2,436)	(25,855)	(188)

-continued-

**Table 21.-Page 2 of 2.**

<b>Northwestern Alaska:</b>							
<b>Year</b>	<b>Number of Anglers</b>	<b>Effort in Angler Days</b>	<b>Chinook Harvest (Catch)</b>	<b>Coho Harvest (Catch)</b>	<b>Chum Harvest (Catch)</b>	<b>Pink Harvest (Catch)</b>	<b>Sockeye Harvest (Catch)</b>
1977		3,487	16	0	28	8	0
1978		4,997	0	0	254	0	0
1979		2,593	10	0	27	0	0
1980		3,841	9	0	86	0	0
1981		5,219	22	0	32	0	0
1982		6,840	0	0	346	0	0
1983		7,963	0	0	463	0	0
1984	717	7,791	13	0	312	0	0
1984	1,922	6,701	0	51	310	68	0
1986	1,649	6,313	0	0	749	62	0
1987	2,191	10,221	95	11	402	0	21
1988	990	5,279	18	0	236	0	0
1989	1,063	4,932	0	0	41	10	0
1990	1,008	3,782	0	0	0	0	0
			(0)	(0)	(303)	(0)	(0)
1991	1,795	9,543	0	0	59	91	0
			(0)	(0)	(284)	(146)	(0)
1992	1,421	6,145	8	0	220	293	0
			(70)	(49)	(987)	(458)	(0)

<sup>a</sup> Effort for all species.

annually, of which coho and pink salmon have comprised about 85%. The Nome River supports more sport fishing effort than any other single water body in northwestern Alaska because of its proximity to Nome and extensive access provided by the road system. Sport fishing on the Nome River has accounted for an annual average of 22% for all the fishing effort in the entire northwestern management area since 1983 (Appendix D).

Salmon sport fisheries in northwestern Alaska are managed in cooperation with the Division of Commercial Fisheries. Subsistence uses are given priority and much of the commercial catch occurs prior to the time when sport fishing is at its peak in the rivers (marine sport fishing is negligible). Since the availability of salmon resources is limited and local chum salmon populations are depressed, particularly in the Nome area where sport fishing effort is greatest, the Nome area has often required restrictive management measures.

### **Recent Fishery Performance**

Estimated harvests and effort in 1992 are similar to recent prior years, with both effort and harvests near the upper end of the range observed during the period of record, from 1977 to 1992 (Table 2).

### **Recent Board of Fisheries Action**

The Board of Fisheries, in 1984, reduced the bag and possession limits in the Nome and Snake rivers to 15 salmon other than king salmon, only 5 of which could be chum and coho in combination. In 1985 all but the lower two miles of the Nome River was closed to all sport fishing for salmon by emergency order.

In 1987, additional regulations were adopted in Seward Peninsula drainages (Cape Prince of Wales to Cape Darby) which changed the bag and possession limit for salmon other than chinook to 10 per day, 10 in possession, only three of which could be chum or coho salmon in combination. The limit for chinook salmon was set at one per day and in possession.

The Nome River was closed in July 1990 to the taking chum salmon on sport fishing gear, and the following year, another emergency order closed Nome area waters to retention both chum and pink salmon. The area affected by this action was more widespread than in previous years and included all waters from the Sinuk River in the west to the Solomon River in the east.

Due to continued low escapements of chum salmon in Nome area streams, a proposal to close sport fishing for chum salmon in the rivers addressed in the 1991 emergency order was brought before the Board of Fisheries and enacted into regulation. This regulation is intended to protect chum salmon stocks and will remain in effect until stocks recover and surpluses above the escapement goals are available for harvest by sport anglers.

Two emergency orders were issued addressing salmon in the Nome area in 1992 (Appendix E). The first closed the Tubutulik and Kwiniuk rivers to sport fishing for chum salmon. The second, because of near record pink salmon runs, increased the bag and possession limits for pink salmon from 10 per day to 20 per day in Nome area streams.

### **Current Issues**

Chum salmon stocks have steadily declined on the Seward Peninsula, as evidenced by failure to achieve desired spawning escapements in many key streams where spawners are enumerated, creating the need for increasingly restrictive sport, commercial and even subsistence fishing

regulations. It is anticipated that until stocks recover, there will be a need to continue with very restrictive measures to protect the stream stocks in the area.

### **Ongoing Research and Management Activities**

No specific activities for salmon have been initiated, however sport fish staff frequently assist and cooperate informally with the Commercial Fisheries Division on projects, including surveys for abundance.

## **NORTHWESTERN ALASKA DOLLY VARDEN AND ARCTIC CHAR**

### **Fishery Description and Historical Perspective**

In the Northwestern Management Area, Arctic char occur in lakes in the Kigluaik Mountains and in some headwater lakes in the Kobuk and Noatak river drainages, while Dolly Varden are common inhabitants of most coastal streams and large rivers (Figure 19).

There are approximately 16,000 people in 28 villages scattered along the coast and along major river systems in northwestern Alaska. Many area residents maintain a traditional lifestyle, and are dependent to some degree on locally harvested fish resources. Dolly Varden comprise an important part of this traditional harvest, and in some local areas are the major fish species present.

In some areas of northwestern Alaska Dolly Varden outrank salmon and whitefish in importance to local subsistence economies. The number of Dolly Varden harvested for subsistence purposes in northwestern Alaska exceeds the number taken by sport anglers, but since few community subsistence harvest estimates are available, the actual magnitude of the annual harvest is not known. Fish are captured with gill nets or beach seines during open water, and with gill nets or with hook and line during winter.

Estimated Dolly Varden spawner abundance is low in most rivers, however, spawning appears to occur in almost all drainages of Norton Sound, some northern Seward Peninsula rivers, and the major drainages of Kotzebue Sound and the Chukchi Sea. Total abundance of spawning Dolly Varden in northwestern Alaska is unknown.

Drainages of Kotzebue Sound and the Chukchi Sea are known for the large size of anadromous Dolly Varden available to the sport angler. Since the inception of ADF&G's Trophy Fish Program in 1967, out of 105 qualifying fish, 32 (30%) have come from this area of northwestern Alaska and one has come from Norton Sound. In addition, the current Alaska sport fish angling record for Arctic char/Dolly Varden (19 lbs. 12 oz.) is a Dolly Varden taken from the Noatak River in 1991. A total of 21 registered trophy fish were taken from the Wulik River alone, comprising 20% of the total fish registered statewide.

During summer, spawning Dolly Varden are targeted in some northwestern Alaskan streams, however, most sport fisheries for char target overwintering populations of Dolly Varden either in the fall as they enter freshwater from the sea, or in the spring as they move toward the sea for feeding. Since overwintering populations are comprised of mixed stocks, potentially from a wide geographic area, harvests in the few rivers with good angler access have been sustainable. In some cases, if such harvests were directed towards a single stock they would not be sustainable.

### **Recent Fishery Performance**

Estimated harvests of Dolly Varden/Arctic char by sport anglers in the Seward Peninsula/Norton Sound area have averaged about 5,000 fish over the past 16 years (Table 22). In the Noatak-Kobuk-Selawik area, sport harvests have averaged 1,200 Dolly Varden/Arctic char annually. In addition to harvests, catches have been estimated through the Statewide Harvest Survey since 1990. Estimates of catch (which includes fish that are kept and those released) in 1990 to 1992 were 9,118, 25,425, and 6,012 fish respectively in the Seward Peninsula/Norton Sound area, corresponding to estimated harvests of 3,765, 10,365 and 2,382. The data suggest that about 60% of all Dolly Varden/Arctic char captured in the Seward Peninsula/Norton Sound area are released. Similar comparisons for the Noatak-Kobuk-Selawik area show that while 3,747 Dolly Varden/Arctic char were caught in 1990, an estimated 2,941 (78%) were released, in 1991, the estimated catch of Dolly Varden/Arctic char was 1,658 of which 509 (30%) were released, and in 1992 7,054 were caught of which 6,472 (91%) were released. While effort levels in both the Seward Peninsula/Norton Sound area and the Noatak-Kobuk-Selawik area were high in 1992, the harvest of Dolly Varden/Arctic char was low in comparison with other recent estimated harvests (Table 22).

### **Recent Board of Fisheries Action**

Sport fisheries for Dolly Varden and Arctic char in northwestern Alaska are actively managed in areas where substantial fishing effort occurs. The Nome area, where access to a relatively large angling public is provided by the highway system, has required restrictive management measures in the past. Prior to 1988, the bag limits for Dolly Varden and Arctic char in combination with Arctic grayling and lake trout was 15 fish per day with only 3 over 15 inches, the possession limit was 30 fish with only 6 over 20 inches. The Board of Fisheries adopted the current regulations for Dolly Varden/Arctic char in the waters of northwestern Alaska in 1988: 10 fish per day with 10 in possession, with exceptions for the Noatak, Wulik and Kivalina Rivers where only two fish can be over 20 inches in length. In 1992, the Sport Fish Division enacted an emergency order limiting the bag and possession limit for Dolly Varden in the Nome River to two fish per day.

### **Current Issues**

The question of how great an impact Dolly Varden have on salmon, especially chum salmon whose populations have been depressed in Norton Sound for several years, has been raised by local residents in a number of public meetings. The Department has no data concerning the possible effects of Dolly Varden egg predation on salmon numbers, however there has been no detectable increase in Dolly Varden numbers in Norton Sound to account for increased predation activity, and Dolly Varden have not been found to be significant predators on chum salmon in any predation studies.

### **Ongoing Research and Management Activities**

ADF&G began an effort to assess Dolly Varden populations in waters of the Seward Peninsula in 1991. Abundances and size compositions have been estimated for Dolly Varden overwintering in the Nome River in 1991 and 1992, and in the Solomon River in 1991. In addition, the movement of marked fish from the Nome River in 1991 to other rivers in 1992 was estimated (DeCicco 1993). These data in combination with harvest estimates and observed changes in abundances have been used to guide ADF&G management activities in exploited waters. It has been learned that Dolly Varden which overwinter in a particular stream may overwinter in other streams during other years. Hence, a restrictive bag limit in one stream does not necessarily protect a single

**Table 22.-Freshwater sport fishing effort and harvests (catches for 1990 to 1992) of Dolly Varden in Seward Peninsula/Norton Sound, and the Noatak-Kobuk-Selawik area of northwestern Alaska 1977-1992. Statistics include Arctic char harvests and catches.**

Year	<u>Seward Peninsula/Norton Sound</u>				<u>Noatak-Kobuk-Selawik Area</u>			
	Number of Anglers	Effort in Angler Days	Dolly Varden Harvest	Dolly Varden Catch	Number of Anglers	Effort in Angler Days	Dolly Varden Harvest	Dolly Varden Catch
1977		7,828	1,621			3,487	469	
1978		8,379	1,690			4,997	199	
1979		NR	NR			2,593	1,772	
1980		7,968	5,811			3,841	301	
1981		10,879	3,981			5,219	1,177	
1982		13,198	6,498			6,840	1,531	
1983		12,678	9,779			7,963	2,192	
1984	1,597	12,558	4,260		696	5,710	3,804	
1985	2,854	18,141	5,695		1,788	6,701	1,557	
1986	2,872	17,257	5,381		1,570	5,744	1,300	
1987	2,528	20,381	5,506		2,090	9,288	1,372	
1988	2,661	19,456	4,437		959	5,248	983	
1989	2,560	15,443	7,003		1,028	4,453	999	
1990	2,686	18,833	3,765	9,118	991	3,682	806	3,747
1991	3,236	22,118	10,365	25,425	1,606	2,967	1,149	1,658
1992	3,540	22,684	2,382	6,012	1,421	6,145	582	7,054
Average	2,726	15,187	5,212	13,518	1,350	5,305	1,262	4,153

NR = no harvest or catch reported.

stock because fish range widely and stocks mix over a broad geographic area. Periodic assessment of Dolly Varden populations will continue.

Studies in the Kotzebue area have continued intermittently since 1967, but in recent years have been limited to counting spawning Dolly Varden in Noatak River tributary streams with the assistance of the National Park Service (NPS), and to counting Dolly Varden overwintering in the Wulik River with the assistance of the Habitat Division of ADF&G. Data on the abundance of Dolly Varden spawning in the Noatak River system and overwintering in the Wulik River will continue to be collected in cooperation with the NPS and the Habitat Division.

## **NORTHWESTERN ALASKA ARCTIC GRAYLING**

### **Fishery Description and Historical Perspective**

In general, the sport fisheries for grayling in the northwestern area are small. However, most populations are also quite small when compared to those of Interior Alaska's rivers.

Since 1989, the ADF&G has investigated stock status of grayling populations in several rivers where sport fishing occurs on the Seward Peninsula. The Nome River stock was found to be overexploited, while the Niukluk, Fish, Pilgrim, Snake and Sinuk rivers populations are believed to sustain current levels of harvest. Grayling in these rivers grow rapidly until reaching seven or eight years of age, after which the rate of growth declines with the onset of sexual maturity and reproductive activity. Maximum longevity exceeds 20 years for some of these fish.

Even when the small size of most Seward Peninsula streams is considered, grayling abundance in the streams is low by comparison with streams in Interior Alaska. For example, the Chena River near Fairbanks has about 300 grayling per mile, and is considered a depressed population. In contrast, densities in Seward Peninsula rivers, except for the Niukluk River which had about 375 grayling per mile, ranged from about 40 to 60 grayling per mile in the Nome and Sinuk rivers, to about 200 grayling per mile in the Fish and Pilgrim rivers. Average size of grayling from Seward Peninsula rivers is generally larger than in Interior Alaska streams. Grayling from Seward Peninsula streams are also generally older and larger when they first spawn than grayling in Interior waters, and since they can live to be very old, some grow to a large size particularly in rivers where fishing effort is light to moderate. Lightly fished rivers have higher proportions of these older-aged and large-size grayling, but the abundance of fish is usually low. An example is the Sinuk River where almost 70% of the 1991 sample was age-8 or older, but the density of fish approached that of the Nome River which has been the most heavily fished stream in the area and where over 90% of the sampled population was age-7 or less (DeCicco 1992).

Populations of grayling in the Kotzebue area are inaccessible by road and are in most cases, lightly exploited. ADF&G has directed no specific studies of any of the stocks throughout this extremely large and remote area. Generally, grayling are known to occur in almost all streams of the area from mouth to headwater areas, and in many of the lakes as well.

Current exploitation rates on most northwestern Alaska grayling populations are unknown, but since most are in remote areas, exploitation is believed to be light. Some estimates of exploitation in Nome area roadside streams are available by combining harvest data with abundance data. Using these data, exploitation rate of Arctic grayling in the Snake River is about 16%. In contrast, the 1991 exploitation rate for the Nome River was about 26% on a population that was already at a very low level. The exploitation rate on the Pilgrim River in 1991 was about 35%,



but only a small section (7 miles of the best habitat) was included in the abundance estimate. If this area represents 40% to 60% of the entire Pilgrim River population, then the real exploitation rate is between 14% and 21%. The Sinuk River exploitation rate is about 12%, but here, the harvest is taken from an area downstream of the area where abundance is estimated, and the overall effective exploitation rate is lower. Exploitation on the Fish-Niukluk River system is thought to be less than 10% (DeCicco 1992).

### **Recent Fishery Performance**

Estimated harvests of Arctic grayling by sport anglers in the Seward Peninsula/Norton Sound area have averaged about 3,500 fish over the past 16 years (Table 23). The most recent three year average harvest has been about 3,600 grayling. In the Noatak-Kobuk-Selawik area, sport harvests have averaged about 2,600 Arctic grayling annually. The most recent three year average harvest in the Seward Peninsula/Norton Sound area was about 2,300 fish, but the most recent year, 1992, was the smallest estimated harvest in the 16 year period. In addition to harvests, catches have been estimated through the Statewide Harvest Survey since 1990. Estimates of catch (which includes fish that are kept and those released) in 1990, 1991, and 1992 are 6,100, 23,200, and 5,774 respectively for the Seward Peninsula/Norton Sound area, corresponding to estimated harvests of 1,400, 5,100, and 490 suggesting that more than three-fourths of all Arctic grayling captured in the Seward Peninsula/Norton Sound area are released (78% released in 1990, 78% released in 1991, and 91% in 1992). It is assumed that anglers selectively retain larger size Arctic grayling, but this may not be true on the Seward Peninsula and in the Unalakleet River where the current daily bag and possession limit is five per day with only one over 15 inches. Similar comparisons for the Noatak-Kobuk-Selawik area show that while 3,328 Arctic grayling were caught in 1990, only 622 (19%) were retained, in 1991, the estimated catch of Arctic grayling was 5,375 while 1,981 (37%) were retained, and in 1992 4,991 grayling were caught and 968 (19%) retained.

### **Recent Board of Fisheries Action**

Sport fisheries for Arctic grayling in northwestern Alaska are actively managed in areas where substantial fishing effort occurs. The Nome area, where access to a relatively large angling public is provided by the highway system, has most often required restrictive management measures. Prior to 1988, the northwestern Alaska daily bag limit for Arctic grayling in combination with trout and char was 15 fish per day with only three over 20 inches in length. The possession limit was two daily bag limits. The Board of Fish established a separate daily bag and possession limit for Arctic grayling at 10 fish per day for the 1988 regulatory year. The Board also established a separate bag and possession limit for Arctic grayling in all waters between Cape Prince of Wales and Cape Darby on the Seward Peninsula and in the Unalakleet River of 5 fish per day of which only one could be over 15 inches in length. In 1992, concern for the status of three Arctic grayling populations on the Seward Peninsula prompted two emergency orders to be placed into effect (Appendix E). One reduced the bag and possession limit in the Pilgrim River to 2 grayling per day of which only one could be over 15 inches in length. The other closed the Nome and Solomon Rivers to the taking of grayling. These emergency orders remained in effect following the 1992 season.

**Table 23.-Estimated sport fishing effort<sup>a</sup> and harvests (catches for 1990 to 1992) of Arctic grayling in Seward Peninsula/Norton Sound area, and in the Noatak-Kobuk-Selawik area of northwestern Alaska 1977-1992.**

Year	<u>Seward Peninsula/Norton Sound</u>				<u>Noatak-Kobuk-Selawik Area</u>			
	Number of Anglers	Effort in Angler Days	Arctic Grayling Harvest	Arctic Grayling Catch <sup>b</sup>	Number of Anglers	Effort in Angler Days	Arctic Grayling Harvest	Arctic Grayling Catch <sup>b</sup>
1977		7,828	1,607			3,487	1,407	
1978		8,379	1,455			4,997	1,997	
1979		NR	NR			2,593	2,145	
1980		7,968	1,635			3,841	1,790	
1981		10,879	2,104			5,219	5,346	
1982		13,198	6,225			6,840	3,421	
1983		12,678	8,241			7,963	4,715	
1984	1,597	12,558	2,349		696	5,710	2,753	
1985	2,854	18,141	4,501		1,788	6,701	2,943	
1986	2,872	17,257	4,042		1,570	5,744	5,121	
1987	2,528	20,381	4,600		2,090	9,288	2,121	
1988	2,661	19,456	4,873		959	5,248	2,692	
1989	2,560	15,443	4,205		1,028	4,453	1,415	
1990	2,686	18,833	1,378	6,119	991	3,682	622	3,328
1991	3,236	22,118	5,121	23,160	1,606	2,967	1,981	5,375
1992	3,540	22,684	492	5,774	1,421	6,145	968	4,991
Average	2,726	15,187	3,522	12,684	1,350	5,305	2,590	4,565

<sup>a</sup> Effort values are for all species.

<sup>b</sup> Catch includes fish caught and released.

NR = no harvest or catch reported.

## **Current Issues**

There is concern on the part of the public and ADF&G staff that populations of grayling in the vicinity of Nome that are road accessible, especially the Nome and Solomon rivers, have been over harvested and may not recover for many years.

## **Ongoing Research and Management Activities**

ADF&G began an ongoing active effort to assess Arctic grayling populations in waters of the Seward Peninsula in 1989. Abundance and age and size compositions have been estimated for Arctic grayling in the Fish, Niukluk, Nome, Pilgrim, Snake and Sinuk Rivers. These data in combination with harvest estimates and observed changes in abundance or size or age compositions have been used to guide ADF&G management activities. Special regulations in some streams and the closure of both the Solomon and Nome Rivers to grayling have resulted. It is anticipated that the Nome River grayling population will recover enough to allow some level of harvest in the future. Periodic assessment of grayling populations will be continued to monitor the condition of populations so the chances of a stock being overexploited can be minimized.

## **KOTZEBUE SOUND SHEEFISH**

### **Fishery Description and Historical Perspective**

With the exception of a small stock of sheefish that spawns in the Koyuk River of Norton Sound, spawning stocks of sheefish do not occur from the Yukon River north to Kotzebue Sound, where important stocks are found in the Kobuk and Selawik rivers.

The drainages of Kotzebue Sound are known for the large size of sheefish which are available to the sport angler. These are high quality sport fisheries in remote locations, and are considered by many anglers to be "trophy" fisheries of considerable value. Since the inception of ADF&G's Trophy Fish Program in 1967, 8 out of the 9 qualifying sheefish have come from the Kobuk River.

Kotzebue Sound sheefish are distributed throughout the nearshore estuarine areas of Kotzebue Sound. The major concentration is in Hotham Inlet but a few fish occur in the Sheshalik and Krusenstern areas as well as in southern Kotzebue Sound, especially in summer (Figure 27). Nearly all sheefish occupying the estuarine environment during summer are immature, while adult prespawning fish move upstream on the Kobuk and Selawik rivers to spawn just before freeze-up in the fall. The most well known and utilized stock spawns in the upper Kobuk River, upstream from the village of Kobuk, with the greatest observed concentration between the Maneluk River and the Selby River. They do not spawn in tributaries of the Kobuk River. After spawning is complete in late September, fish disperse to downstream overwintering areas.

Sport fisheries for sheefish in northwestern Alaska are managed by the Division of Sport Fish of ADF&G. Subsistence fisheries are given priority. The commercial fishery and much of the subsistence harvest takes place through the ice while sport fisheries are mainly summer and fall activities. The same population(s) contribute to all harvests.

In Northwestern Alaska, most sheefish sport fishing effort occurs on the Kobuk River spawning component of the Kobuk-Selawik sheefish population. Most of the area-wide subsistence harvest and the entire commercial harvest of sheefish occurs on the entire population. When taken in isolation, sport harvests are easily sustainable, however, the size of the population(s) is not known, and the magnitude of the subsistence harvest is not known for certain. It is thought that

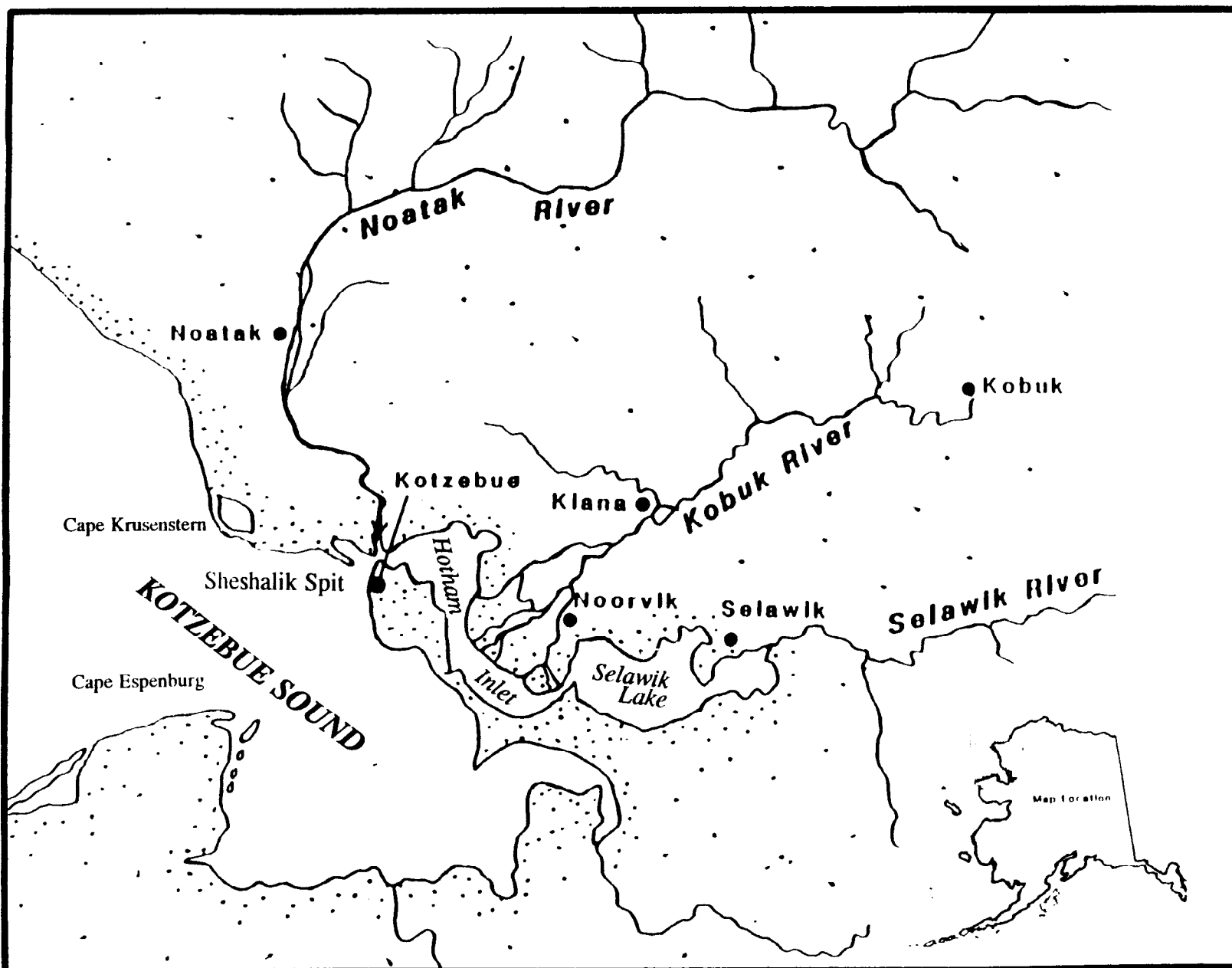


Figure 27.-Kotzebue Sound waters.

since subsistence practices have not changed appreciably in recent years, the harvests have been relatively stable, however, this is not known for certain. It is known that subsistence harvests are much greater than commercial harvests and the harvest taken by sport anglers. In order to ensure sustained yields from this population(s), a management approach involving the subsistence and commercial fisheries for sheefish, is necessary. The current lack of population data on sheefish makes responsible management difficult.

### **Recent Fishery Performance**

Estimated harvests of sheefish by sport anglers in northwestern Alaska have averaged about 1,400 fish over the past 16 years (Table 24). The most recent three year average harvest has been 886 sheefish. In addition to harvests, catches have been estimated through the SHS since 1990. Estimates of sheefish catch (which includes fish that are kept and those released) for 1990, 1991, and 1992 were 403, 1,616, and 3,678 respectively. These correspond to harvests of 151, 603, and 1,904 for those years, indicating that about 60% of all sheefish captured in northwestern Alaska by sport anglers are released.

### **Recent Board of Fisheries Action**

During 1988, the Board of Fisheries adopted the current regulations for sheefish in the waters of northwestern Alaska: 10 fish per day with 10 in possession, with an exception for the Kobuk River upstream of the Mauneluk River where only 2 sheefish may be caught per day or possessed. ADF&G believes that these regulations are sufficient to allow ample opportunity for sport fishing yet keep harvests within what is thought to be a sustainable level. The 10 fish limit in the lower Kobuk River and the remainder of the management area is liberal enough to allow local fishermen who choose to catch sheefish on sport fishing tackle the opportunity to take sheefish without the need to fish with nets.

### **Current Issues**

Local native residents of Kobuk River villages have expressed concern over some practices of sport anglers on the upper Kobuk River in the vicinity of the sheefish spawning grounds. Catch and release fishing is considered by some local residents to be disrespectful and damaging to the fish, and the discarding of filleted carcasses in the water is thought to drive other sheefish away from the area. The ADF&G Division of Subsistence investigated local concerns in the upper Kobuk River in 1986 and determined that some concerns could be addressed if sport fishers were more aware of local customs and culture. However, catch and release fishing is viewed as a conservation tool by ADF&G and by many anglers. Sheefish are very sensitive to rough handling, however, the Department believes that if sheefish are handled gently, they can be released without significant mortality. It is possible that studies to quantify the mortality of sheefish caught and released on sport fishing gear will be undertaken in the near future.

### **Ongoing Research and Management Activities**

The Sport Fish Division of ADF&G conducted studies of the ecology, movements, and growth of sheefish between 1966 and 1979. Much of this work was conducted in northwestern Alaska. Alt (1987) summarized past work on sheefish in 1987, but ADF&G has not conducted further studies of sheefish since 1979. A project to estimate the abundance of sheefish spawning in the Kobuk River has been proposed and will be undertaken when funding becomes available.

**Table 24.-Sport fishing<sup>a</sup> and harvests (catches<sup>b</sup> for 1990 to 1992) of sheefish in Northwestern Alaska, 1977-1992.**

Year	Number of Anglers	Effort in Angler Days	Sheefish Harvest	Sheefish Catch
1977		3,487	656	
1978		4,997	506	
1979		2,593	709	
1980		3,841	1,713	
1981		5,219	1,263	
1982		6,840	2,222	
1983		7,963	2,079	
1984	717	7,791	3,050	
1985	1,922	6,701	1,645	
1986	1,649	6,313	3,363	
1987	2,191	9,288	1,836	
1988	990	5,279	964	
1989	1,063	4,453	629	
1990	1,008	3,782	151	403
1991	1,795	9,543	603	1,616
1992	1,421	6,145	1,904	3,678
Average	1,417	5,890	1,456	1,899

<sup>a</sup> Effort values are for all species.

<sup>b</sup> Catch includes fish caught and released.

## **KOTZEBUE SOUND NORTHERN PIKE**

### **Fishery Description and Historical Perspective**

There are approximately 16,000 people in 28 villages scattered along the coast and along major river systems in northwestern Alaska. Many area residents maintain a traditional lifestyle, and are dependent to some degree on locally harvested fish resources. Northern pike taken for subsistence uses comprise an important part of this harvest in some local areas.

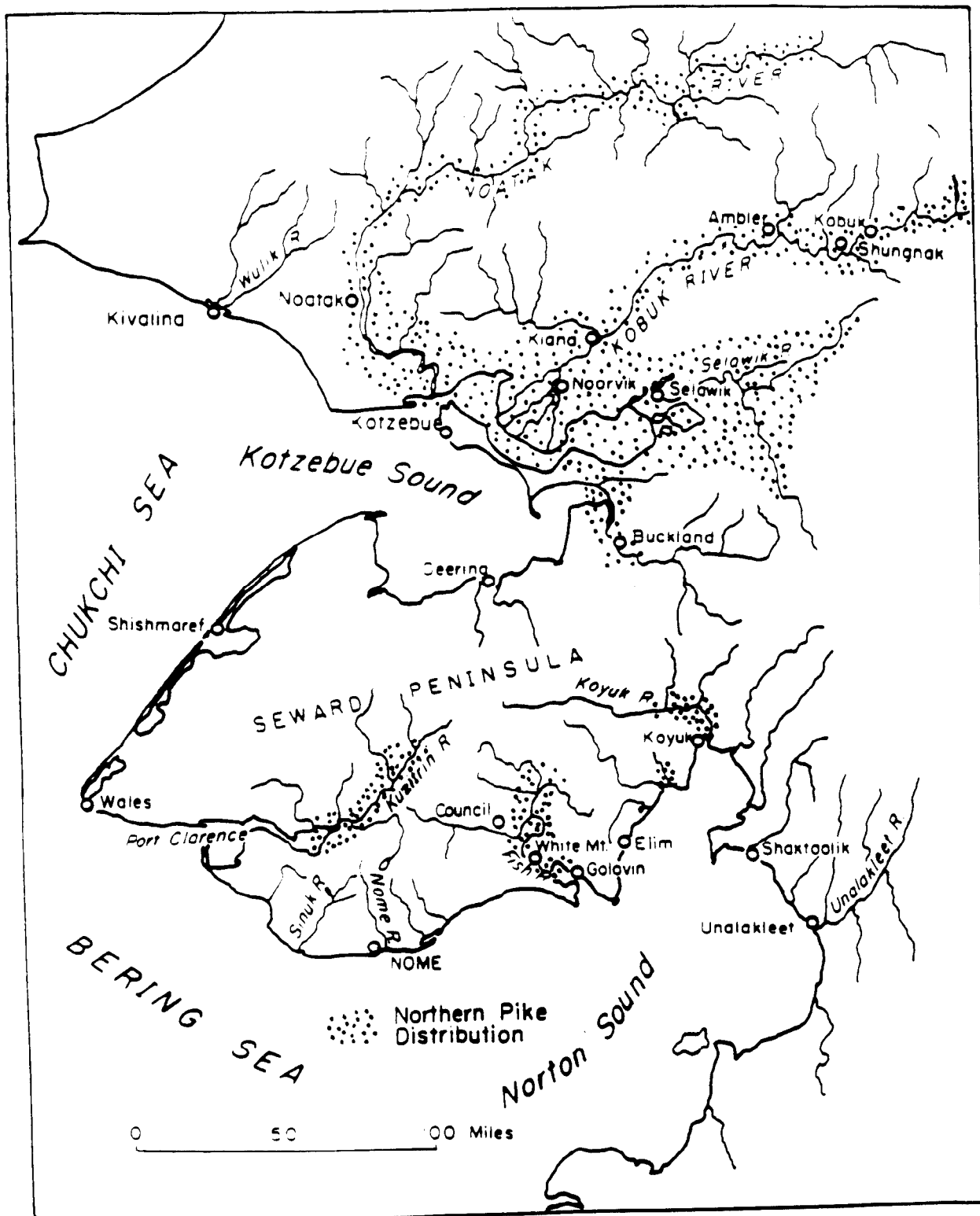
Northern pike are present throughout the northern regions of the world. They are primarily a freshwater resident species, but are known to enter weakly brackish waters in the Baltic and in some other areas. The known distribution of northern pike in northwestern Alaska is shown in Figure 28.

Northern pike occur in most of the lakes and flowing waters of the Noatak and Kobuk Rivers and are particularly common in wetlands of the lower reaches, delta areas, and in lakes in lowland areas adjacent to these rivers. Northern pike are also common residents of the waters along the western shores of Hotham Inlet, Selawik Lake and the entire Selawik lowland area. They occur in the lower portions of the Buckland River drainage, and may also be present in some lakes and streams on the northern Seward Peninsula. On the southern Seward Peninsula, northern pike are common residents of Imuruk Basin and the middle and lower reaches of the Pilgrim and Kuzitrin Rivers. Northern pike also inhabit most of the Fish River drainage and have even been observed in the fast clear waters of the Niukluk River downstream from Council. They also occur in the Koyuk River and may be present in the Kwik River near Moses Point, but are not known to be present in other Norton Sound drainages south of the Koyuk River.

The majority of northern pike harvested in northwestern Alaska are taken for subsistence. Few community harvest estimates are available. However, in 1986, 5,750 northern pike were estimated to have been harvested by the community of Kotzebue. During the mid 1980's a commercial freshwater fishery occurred near Selawik. In 1985, the U.S. Fish and Wildlife Service estimated that the spring subsistence/commercial harvest (only some of the fish were sold) of northern pike was between 5,671 and 9,138 fish. Currently, without the commercial fishery, the annual harvest at Selawik is still likely several thousand northern pike. Northern pike are also harvested by residents of the lower Kobuk River villages of Noorvik and Kiana, and the residents of Teller who fish in Imuruk Basin drainages. Additional harvests of northern pike may take place near other area villages. The total annual northwestern Alaska northern pike subsistence harvest is likely 10,000 fish or more.

### **Recent Fishery Performance**

Estimated harvests of northern pike by sport anglers on the Seward Peninsula have averaged 615 fish since 1977, with the two largest harvests estimated for 1990 and 1991 (Table 25). In addition to harvests, catches have been estimated through the Statewide Harvest Survey since 1990. Estimates of catch (which includes fish that are kept and those released) in 1990, 1991, and 1992 are 4,145, 4,257, and 3,742 respectively, corresponding to estimated harvests of 1,957, 1,429, and 479. These data suggest that more than half of all northern pike captured on the Seward Peninsula are released (53% released in 1990, 66% released in 1991, and 81% released in 1992). It is assumed that anglers are selectively retaining larger sized northern pike. Most of the harvest of pike on the Seward Peninsula takes place in the Pilgrim or Kuzitrin River drainages. In 1992, 48% of the entire estimated Seward Peninsula harvest of northern pike and 23% of the catch



**Figure 28.-The known distribution of northern pike in the Northwest Alaska Management Area.**



**Table 25.-Freshwater sport fishing effort<sup>a</sup> and harvests (catches for 1990 and 1992) of northern pike in Seward Peninsula/Norton Sound, and the Noatak-Kobuk-Selawik area of northwestern Alaska 1977-1992.**

Year	<u>Seward Peninsula/Norton Sound</u>				<u>Noatak-Kobuk-Selawik Area</u>			
	Number of Anglers	Effort in Angler Days	Pike Harvest	Pike Catch <sup>b</sup>	Number of Anglers	Effort in Angler Days	Pike Harvest	Pike Catch
1977		7,828	302			3,487	147	
1978		8,379	389			4,997	389	
1979		NR	NR			2,593	527	
1980		7,968	284			3,841	852	
1981		10,879	303			5,219	465	
1982		13,198	210			6,840	454	
1983		12,678	798			7,963	1,262	
1984	1,597	12,558	208		696	5,710	312	
1985	2,854	18,141	56		1,788	6,701	383	
1986	2,872	17,257	699		1,570	5,744	2,752	
1987	2,528	20,381	906		2,090	9,288	813	
1988	2,661	19,456	564		959	5,248	1,565	
1989	2,560	15,443	648		1,028	4,453	64	
1990	2,686	18,833	1,957	4,145	991	3,682	320	1,730
1991	3,236	22,118	1,429	4,257	1,606	2,967	394	1,879
1992	3,540	22,684	479	3,742	1,421	6,145	333	1,666
Average	2,726	15,187	615	4,048	1,350	5,305	690	1,758

<sup>a</sup> Effort for all species.

NR = no harvest or catch reported.

came from these two adjacent drainages. These two drainages form a large interconnected wetland area (approximately 380 km<sup>2</sup>) in their lower reaches, prior to entering Imuruk Basin. In addition there is another large wetland area (approximately 650 km<sup>2</sup>) farther upstream in the Kuzitrin River drainage.

Estimated sport harvests of northern pike in the Noatak-Kobuk-Selawik area of northwestern Alaska have averaged 690 fish since 1977 (Table 25). Estimated harvests reached a high of 2,752 fish in 1986, and a low of 64 fish in 1989. Since assessment of northern pike populations has not been carried out in this area of northwestern Alaska, the health of populations and relative influence of harvests can only be inferred by comparing the area to other areas of Alaska. Since the amount of suitable northern pike habitat in the Noatak-Kobuk-Selawik area is much greater (by approximately 50 times) than that available to northern pike in the Pilgrim-Kuzitrin area, and the sport harvests are much lower, it is unlikely that sport fisheries are adversely impacting northern pike populations (even when taken in addition to a subsistence harvest of 6,000 to 10,000 fish).

### **Recent Board of Fisheries Action**

The current bag and possession limit of 10 fish per day has been in place since 1987 when the Board of Fisheries established regulations for this species. No changes have been made or proposed since that time.

### **Current Issues**

Northern pike populations have been shown to sustain annual harvests of about 15%. Current exploitation of the Pilgrim-Kuzitrin population appears to be about 10%, which is well within sustainable levels. However, if harvests continue to increase, management actions may be necessary in this fishery.

### **Ongoing Research and Management Activities**

During 1992, the abundance of northern pike in the lower Pilgrim and Kuzitrin rivers was estimated for the first time (Burkholder 1993). The estimate was about 10,000 fish over 457 mm (18 in) in length. An additional year of population assessment is planned for the area in 1993. These additional data should give ADF&G a more precise estimate of abundance, and a better idea of the amount of mixing of northern pike between the lower parts of the two river drainages. These data will aid in assessing impacts of future harvests.

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## **LITERATURE CITED**

- Alaska Department of Fish and Game (ADF&G). 1984. Sport Fish Survey. Booklet published by Alaska Department of Fish and Game, Division of Sport Fisheries. Juneau, Alaska.
- Alaska Department of Fish and Game (ADF&G). 1993. Salmon fisheries in the Yukon area, Alaska. A report to the Alaska board of Fisheries. Regional Information Report No: 3A93-02. Alaska Department of Fish and Game, Division of Commercial Fisheries, AYK Region, Anchorage.
- Alaska Department of Fish and Game (ADF&G). 1986. Alaska Habitat Management Guide, Arctic Region. Vol. II: Distribution, abundance, and human use of fish and wildlife. Division of Habitat, Alaska Department of Fish and Game, Juneau.

## LITERATURE CITED (Continued)

- Alaska Department of Labor (ADL). 1991. Alaska Population Overview 1990 Census and Estimates. Demographic Unit, Research and Analysis. Juneau, Alaska. 144 pp.
- Alaska National Interest Lands Conservation Act (ANILCA). 1980. Act of Congress. Public Law 96-487, December 2, 1980.
- Alt, K. T. 1975. A life history study of sheefish and whitefish in Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration. Annual Performance Report. 1974-1975, Project F-9-7, 16(R-II): 19 pp.
- Alt, K. T. 1977. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Project F-9-9, Completion Report, 1975-1977. 19 (G-I-P), Juneau.
- Alt, K. T. 1978. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Alaska Department of Fish and Game, Federal Aid in Fish Restoration. Annual Report of Progress. 1977-1978, Project F-9-10, 19(G-I-P), Juneau.
- Alt, K. T. 1984. Inventory and cataloging of sport fish and sport fish waters of western Alaska. Part B: Fisheries resource investigations and sheefish adaptability studies. Alaska Department of Fish and Game, Federal Aid in Fish Restoration Annual Performance Report, 1983-1984, Project F-9-16, 25(G-I-P-B), Juneau.
- Alt, K. T. 1987. Review of Sheefish (*Stenodus leucichthys*) studies in Alaska. Alaska Department of Fish and Game. Fishery Manuscript No. 2. Juneau.
- Andersen, F. A., W. H. Arvey, A. L. DeCicco, J. E. Hallberg, and J. F. Parker. 1992. Overview of recreational fisheries, stock status and regulatory recommendations for the AYK Region of Alaska. Alaska Department of Fish and Game. A Report to the Alaska Board of Fisheries, Bethel, Alaska.
- Armstrong, R. H., H. Hop, and J. H. Triplehorn. 1986. Indexed bibliography of the holarctic genus *Thymallus* (grayling) to 1985. Biological papers of the University of Alaska. Institute of Arctic Biology. No. 23. 110 pp.
- Arvey, W. D. and A. L. DeCicco. 1989. Northern pike in the vicinity of the Yukon River haul road crossing, 1988. Alaska Department of Fish and Game, Fishery Data Series No. 105, Juneau.
- Arvey, W. D. and A. Burkholder. 1990. Stock assessment of northern pike in the vicinity of the Yukon River haul road crossing, 1988 and 1989. Alaska Department of Fish and Game, Fishery Manuscript No. 90-1, Anchorage.
- Arvey, W. D., and M. J. Mills. 1993. Sport harvest of anadromous salmon in the Yukon River drainage, 1977-1991. Alaska Department of Fish and Game. Fishery Data Series No. 93-3, Anchorage.
- Barton, L. H. 1984. A catalog of Yukon River spawning escapement surveys. Alaska Department of Fish and Game, Technical Data Report No. 121, Juneau.
- Baxter, R. 1977. Hoholitna River reconnaissance survey, 1977. Kuskokwim Resource Report #3. Arctic Yukon and Kuskokwim Region, Commercial Fisheries Division, Alaska Department of Fish and Game, Anchorage.
- Bendock, T. N.. 1980. Inventory and cataloging of arctic area waters. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual performance report, 1979-1980. Project F-9-12, 21(G-I-I), Juneau.
- Bendock, T. N. 1982. Inventory and cataloging of arctic waters. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual performance report, 1981-1982. Project F-9-14, 23(G-I-I), Juneau.
- Bendock, T. N. 1983. Inventory and cataloging of arctic area waters. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual performance report, 1982-1983. Project F-9-15, 20(G-I-I), Juneau.
- Bendock, T. N. and Burr, J. M. 1984. Inventory and cataloging of arctic area waters. Alaska Department of Fish and Game, Federal Aid in Fish Restoration, Annual performance report, 1983-1984. Project F-9-16, 25(G-I-I), Juneau.

## LITERATURE CITED (Continued)

- Bendock, T. N. 1985. *Unpublished*. Freshwater fish distributions in the central arctic coastal plain (Topagoruk River to Ikpikpuk River). Alaska Department of Fish and Game, Division of Sport Fish, Fairbanks.
- Bergstrom, D. J., C. Blaney, K. C. Shultz, R. R. Holder, G. J. Sandone, D. J. Schneiderhan, L. H. Barton, and D. Mesiar. 1992. Annual Management Report Yukon Area, 1991. Regional Information Report No. 3A92-26. Alaska Department of Fish and Game, Division of Commercial Fisheries, AYK Region., Anchorage.
- Burkholder, A. 1993. Abundance and length-at-age composition of northern pike near the confluence of the Pilgrim and Kuzitrin rivers, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-16, Anchorage.
- Burr, J. M. 1987. Synopsis and bibliography of lake trout, *Salvelinus namaycush* in Alaska. Alaska Department of Fish and Game, Fishery Manuscript No. 5, Juneau.
- Burr, J. M. and P. Hansen. 1993. Assessment of catch and effort characteristics of the lake trout fisheries in the Tanana River drainage in 1991 from a postal questionnaire. Alaska Department of Fish and Game, Fishery Data Series No. 93-37, Anchorage.
- Clark, J. H. 1992. Proposals considered and changes made to the regulatory structure of the sport fishery in the Arctic-Yukon-Kuskokwim Region of Alaska by the Alaska Board of Fisheries at their February 1992 meeting. Alaska Department of Fish and Game, Fishery Management Report 92-1, Anchorage.
- Clark, R. A. 1987. Arctic grayling harvests, stock status, and regulatory concerns in the Arctic Yukon Kuskokwim region. A report to the Alaska Board of Fisheries, December, 1987. Alaska Department of Fish and Game, 1300 College Rd. Fairbanks, Alaska, 99701.
- Clark, R. A. 1992. Age and size at maturity of Arctic grayling in selected waters of the Tanana drainage. Alaska Department of Fish and Game, Fishery Manuscript No. 92-5, Anchorage.
- Clark, R. A. 1993a. Interannual intrastream movements of Arctic grayling in the Chena, Salcha, and Goodpaster rivers. Alaska Department of Fish and Game, Fishery Manuscript No. 93-2, Anchorage.
- Clark, R. A. 1993b. Stock status and rehabilitation of Chena River Arctic grayling during 1991 and 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-5, Anchorage.
- Clark, R. A. 1993c. Stock assessment of Arctic grayling in Fielding Lake during 1991 and 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-2, Anchorage.
- Clark, R. A. 1994. Stock status and rehabilitation of Chena River Arctic grayling during 1993. Alaska Department of Fish and Game, Fishery Data Series No. 94-(in prep.), Anchorage.
- Clark, R. A. and W. P. Ridder. 1987. Abundance and length composition of selected grayling stocks in the Tanana drainage during 1986. Alaska Department of Fish and Game, Fishery Data Series No. 26, Juneau.
- Clark, R. A. and W. P. Ridder. 1988. Stock assessment of Arctic grayling in the Tanana River drainage. Alaska Department of Fish and Game, Fishery Data Series No. 54, Juneau.
- DeCicco, A. L. 1992. Assessment of selected stocks of Arctic grayling in streams of the Seward Peninsula, Alaska during 1991, Fishery Data Series No. 92-13, Anchorage.
- DeCicco, A. L. 1993. Assessment of Dolly Varden overwintering in selected streams of the Seward Peninsula, Alaska, during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-20, Anchorage.
- DeCicco, A. L. and R. M. Barnes. 1992. Listing of guiding services for recreational fishing in the Arctic-Yukon-Kuskokwim (AYK) Region. Alaska Department of Fish and Game, Special Publication No. 92-3, Anchorage.
- Doxey, M. 1987. Tanana drainage lake stocking evaluations, 1986. Alaska Department of Fish and Game, Fishery Data Series No. 31, Juneau.
- Evenson, M. J. 1990. Movement, abundance, and length composition of burbot in rivers of interior Alaska during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-3, Juneau.

## LITERATURE CITED (Continued)

- Evenson, M. J.. 1991. Abundance and size composition of burbot in rivers of interior Alaska during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-33, Anchorage.
- Evenson, M. J. 1992. Abundance size composition of burbot in rivers of interior Alaska during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-12, Anchorage.
- Evenson, M. J. 1993a. Abundance, egg production, and age-sex-length composition of the chinook salmon escapement in the Chena River, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-6, Anchorage.
- Evenson, M. J. 1993b. A summary of abundance, catch per unit effort, and mean length estimates of burbot sampled in rivers of interior Alaska, 1986-1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-15, Anchorage.
- Evenson, M. J. 1993c. Seasonal movements of radio-implanted burbot in the Tanana River drainage. Alaska Department of Fish and Game, Fishery Data Series No. 93-47, Anchorage.
- Fleming, D. F. 1991. Stock assessment of Arctic grayling in Piledriver Slough 1991. Alaska Department of Fish and Game, Fishery Data Series No. 91-71, Anchorage.
- Fleming, D. F. 1993. Stock assessment of humpback whitefish and least cisco in the Chatanika River during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-25, Anchorage.
- Fleming, D. F., and G. J. Schisler. 1993. Stock assessment of Arctic grayling and rainbow trout in Piledriver Slough during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-8, Anchorage.
- Francisco, R. K., K. Schultz, D. Schneiderhan, and D. Huttunen. 1987. Annual Management Report Kuskokwim Area 1985-1986. Alaska Department of Fish and Game, Division of Commercial Fisheries, Bethel. Unpublished agency report.
- Francisco, R. K., C. Anderson, C. Burkey Jr., M. W. Coffing, K. E. Hyer, D. B. Molyneaux, and C. Utermohle 1993. Annual Management Report for the subsistence and commercial fisheries of the Kuskokwim Area 1992. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 3A93-11. Bethel, AK.
- Furniss, R. A. 1974. Inventory and cataloging of arctic area waters. Alaska Department of Fish and Game Federal Aid in Fish Restoration, Annual performance report, 1973-1974. Project F-9-6, 15(G-I-I).
- Hallberg, J. E. 1984. Evaluation of Interior Alaska waters and sport fish with emphasis on managed waters-Fairbanks District. Alaska Department of Fish and Game Federal Aid in Fish Restoration, Annual performance report, 1983-1984. Project F-9-16, 25(G-III-H).
- Hallberg, J. E. and R. A. Holmes. 1987. Abundance and size composition of Chatanika River least cisco and humpback whitefish with estimates of exploitation by recreational spear fishermen. Alaska Department of Fish and Game, Fishery Data Series No. 25, Juneau.
- Holmes, R. and Pearse, G. 1987. Northern Pike stock status and regulatory concerns in the Arctic Yukon Kuskokwim Region. A report to the Alaska Board of Fisheries, December, 1987. Alaska Department of Fish and Game, 1300 College Rd., Fairbanks, Alaska, 99701.
- Jones and Stokes Assoc. Inc. 1987. Southcentral Alaska sport fishing economic study. Final research report. November 1987. (JSA86-0413) Sacramento, CA. Prepared for Alaska Department of Fish and Game, Sport Fish Division, Research and Technical Services Section, Anchorage, AK.
- Kretsinger, C. 1987. Fishery inventory of lakes and streams in the Kigluaik mountains and Imuruk Basin watershed (Seward Peninsula). Unpublished paper, U.S. Bureau of Land Management. Kobuk District Office, Fairbanks.

## LITERATURE CITED (Continued)

- Lafferty, R., J. F. Parker, and D. R. Bernard. 1992. Stock assessment and biological characteristics of burbot in lakes of interior Alaska during 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-20, Anchorage.
- Mills, M. J. 1979. Alaska statewide sport fish harvest studies. 1977 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1977-1978. Project F-9-11, 20 (SW-1): 112 pp.
- Mills, M. J. 1980. Alaska statewide sport fish harvest studies. 1978 data. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1979-1980. Project F-9-12, 21 (SW-1): 65 pp.
- Mills, M. J. 1981. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1980-1981. Project F-9-13, 22 (SW-1): 78 pp.
- Mills, M. J. 1982. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1981-1982. Project F-9-13, 23 (SW-1): 115 pp.
- Mills, M. J. 1983. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1982-1983. Project F-9-14, 24 (SW-1): 118 pp.
- Mills, M. J. 1984. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1983-1984. Project F-9-16, 25 (SW-1): 122 pp.
- Mills, M. J. 1985. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1984-1985. Project F-9-17, 26 (SW-1): 88 pp.
- Mills, M. J. 1986. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1985-1986. Project F-9-18, 27 (SW-1): 137 pp.
- Mills, M. J. 1987. Alaska statewide sport fish harvest studies. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1986-1987. Project F-9-19, 28 (SW-1): 91 pp.
- Mills, M. J. 1988. Alaska statewide sport fisheries harvest report 1987. Alaska Department of Fish and Game, Fishery Data Series No. 52, Juneau.
- Mills, M. J. 1989. Alaska statewide sport fisheries harvest report 1988. Alaska Department of Fish and Game, Fishery Data Series No. 122, Juneau.
- Mills, M. J. 1990. Harvest and participation in Alaska sport fisheries during 1989. Alaska Department of Fish and Game, Fishery Data Series No. 90-44, Anchorage.
- Mills, M. J. 1991. Harvest, catch and participation in Alaska sport fisheries during 1990. Alaska Department of Fish and Game, Fishery Data Series No. 91-58, Anchorage.
- Mills, M. J. 1992. Harvest, catch, and participation in Alaska sport fisheries during 1991. Alaska Department of Fish and Game, Fishery Data Series Number 92-40, Anchorage.
- Mills, M. J. 1993. Harvest, catch, and participation in Alaska sport fisheries during 1992. Alaska Department of Fish and Game, Fishery Data Series Number 93-42, Anchorage.
- Morrow, J. E. 1980. Analysis of the Dolly Varden charr, *Salvelinus malma*, of northwestern North America and northeastern Siberia. In Charrs. Salmonid Fishes of the genus *Salvelinus*. ed. by Balon, E. K. Publ. by Dr. W. Junk, the Netherlands. pp 323-338.
- National Park Service (NPS). 1984. Kobuk Valley National Park draft statement for management. USDI: NPS, Alaska Regional Office, Anchorage, Alaska.
- National Park Service (NPS). 1985. Gates of the Arctic National Park General Management Plan. USDI: NPS, Alaska Regional Office, Anchorage, Alaska.
- Parker, J. F. 1993. Stock assessment and biological characteristics of burbot in Fielding and Harding lakes during 1992. Alaska Department of Fish and Game, Fishery Data Series 93-9, Anchorage.

## LITERATURE CITED (Continued)

- Philo, L. M. and L. L. Moulton. 1993. The occurrence and description of anadromous and freshwater fish in Teshekpuk Lake, Alaska 1990-1992. Dept. of Wildlife Management North Slope Borough, P.O. Box 69, Barrow, AK 99723. 96 pp.
- Redick, R. R. 1967. A review of literature on lake trout life history with notes on Alaska management. Alaska Department of Fish and Game, Informational Leaflet 111. 19 pp.
- Ridder, W. P., T. R. McKinley, and R. A. Clark. 1993. Stock assessment of Arctic grayling in the Salcha, Chatanika, and Goodpaster rivers during 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-11, Anchorage.
- Roach, S M. and M. J. Evenson. 1993. A geometric approach for estimating and predicting fecundity of Tanana River burbot. Alaska Department of Fish and Game, Fishery Data Series No. 93-38, Anchorage.
- Rue, S., N. Hemming and M. McGuiness. 1987. A method of evaluating the recreation potential of Alaska rivers. Submitted under contract to the National Park Service, Alaska Regional Office by the Wildlife Federation of Alaska, the Alaska affiliate of the National Wildlife Federation. 118 pp.
- Russell, R. 1980. A fisheries inventory of waters in the Lake Clark Monument area. Alaska Department of Fish and Game, Division of Sport Fish, and United States Department of the Interior, National Park Service.
- Selkregg, L. L. 1976. Alaska regional profiles: Arctic region. Arctic Environmental Information and Data Center, University of Alaska, Anchorage.
- Skaugstad, C. 1993a. Abundance, egg production, and age-sex-length composition of the chinook salmon escapement in the Salcha River, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-23, Anchorage.
- Skaugstad, C. 1993b. Comparative catch per unit of effort of resident and stocked species of fish test netted in Harding Lake, 1992. Alaska Department of Fish and Game, Fishery Data Series No. 93-4, Anchorage.
- Timmons, L. S. 1990. Abundance and length, age, and sex composition of Chatanika River humpback whitefish and least cisco. Alaska Department of Fish and Game, Fishery Data Series No. 90-2, Anchorage.
- Timmons, L. S. 1992. Evaluation of the rainbow trout stocking program for Piledriver Slough, 1991. Alaska Department of Fish and Game, Fishery Data Series No. 92-5, Anchorage.
- Timmons, L. S., and R. A. Clark. 1991. Stock status of Piledriver Slough Arctic grayling. Alaska Department of Fish and Game, Fishery Data Series No. 91-37, Anchorage.
- U.S. Army Corps of Engineers, Alaska District. 1967. Harbors and Rivers in Alaska. Interim Report No. 6. Northwestern Alaska.
- U.S. Fish and Wildlife Service (USFWS). 1982. Arctic National Wildlife Refuge coastal plain resource assessment. Initial report baseline study of the fish, wildlife, and their habitats. USDI: USFWS, Region 7. 1011 E. Tudor Rd., Anchorage, Alaska 99503. 507 pp.
- U.S. Fish and Wildlife Service (USFWS). 1985. Yukon Flats National Wildlife Refuge Plan. USDI: USFWS, Region 7. 1011 E. Tudor Rd., Anchorage, Alaska 99503.
- U.S. Fish and Wildlife Service (USFWS). 1987. Nowitna National Wildlife Refuge Plan. USDI: USFWS, Region 7. 1011 E. Tudor Rd., Anchorage, Alaska 99503.
- Wild and Scenic Rivers Act 1968. U.S. Public Law 90-542. Amended December, 1980 with Public Law 96-603-605.
- Whitmore, C., D. J. Bergstrom, and F. M. Andersen. 1987. Annual Management Report, 1987, Yukon Area. Regional Information Report No. 3A88-30. Alaska Department of Fish and Game, Division of Commercial Fisheries, Anchorage and Fairbanks. 167 pp.





## APPENDIX A

## **Appendix A.—National Wild and Scenic Rivers in the Arctic Yukon Kuskokwim Region.**

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### **Streams Within The National Park System**

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Alatna River. The main stem within the Gates of Arctic National Park.

John River. The portion of the river within the Gates of the Arctic National Park.

Kobuk River. The portion within the Gates of the Arctic National Park and Preserve.

Noatak River. The river from its source in the Gates of the Arctic National Park to its confluence with the Kelly River in the Noatak National Preserve.

North Fork of the Koyukuk River. The portion within the Gates of the Arctic National Park.

Tinayguk River. The portion within the Gates of the Arctic National Park.

Salmon River. The portion with the Kobuk Valley National Park.

Charley River. The entire river, including its major tributaries, Copper Creek, Bonanza Creek, Hosford Creek, Derwent Creek, Flat-Orthmer Creek, Crescent Creek, and Moraine Creek, within the Yukon-Charley Rivers National Preserve.

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### **Streams Within The National Wildlife Refuge System**

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Andreafsky River. The portion from its source, including all headwaters, and the East Fork, within the boundary of the Yukon Delta National Wildlife Refuge.

Ivishak River. The portion from its source, including all headwaters and an unnamed tributary from Porcupine Lake with the boundary of the Arctic National Wildlife Range.

Nowitna River. The portion from the point where the river crosses the west limit of township 18S, Range 22E, Kateel River meridian, to its confluence with the Yukon River within the boundaries of the Nowitna National Wildlife Refuge.

Selawik River. The portion from a fork of the headwaters in township 12N, Range 10E, Kateel River meridian to the confluence of the Kugarak River; within the Selawik National Wildlife Refuge .

Sheenjek River. The segment within the Arctic National Wildlife Refuge.

Wind River. The portion from its source, including all headwaters and one unnamed tributary in township 13 S, within the boundaries of the Arctic National Wildlife Refuge.

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Streams Located Outside National Parks and Refuges

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Fortymile River. The mainstem within the State of Alaska; O'Brien Creek; South Fork; Napoleon Creek, Franklin Creek, Uhler Creek, Walker Fork downstream from the confluence of Liberty Creek; Wade Creek; Mosquito Fork downstream from the vicinity of Ketchumstuk; West Fork Dennison Fork downstream from the confluence of Logging Cabin Creek; Dennison Fork downstream from the confluence of West Fork Dennison Fork; Logging Cabin Creek; North Fork; Hutchison Creek; Champion Creek; the Middle Fork downstream from the confluence of Joseph Creek; and Joseph Creek.

Delta River. The segment from and including all of the Tangle Lakes to a point one-half mile north of Black Rapids.

Beaver Creek. The segment of the main stem from the vicinity of the confluence of the Bear and Champion Creeks downstream to its exit from the northeast corner of township 12N, Range 6E, Fairbanks meridian within the White Mountains National Recreation Area, and the Yukon Flats National Wildlife Refuge.

Birch Creek. The segment of the main stem from the south side of Steese Highway in township 7N, Range 10E, Fairbanks meridian, downstream to the south side of the Steese Highway in township 10N, Range 16E,.

Unalakleet River. The segment of the main stem from the headwaters in township 12S, Range 3W, Kateel River meridian extending downstream approximately 65 miles to the western boundary of township 18S, range 8W.

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## APPENDIX B

**Appendix B.—Sport fishing regulation proposals for the AYK Region considered by the Alaska Board of Fisheries in 1992.**

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Proposal Number 277. 5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. This proposal closes a section of the Chatanika River drainage to fishing for chinook salmon.

In the Chatanika River, upstream from a department marker located approximately one mile (1.6 km) upstream from the Elliott Highway bridge, is closed to the taking of chinook salmon.

Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed unanimously, no changes.

Proposal Number: 278. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS. This proposal establishes a uniform bag and possession limit for chinook salmon in all flowing waters of the Tanana River drainage.

In all flowing waters of the Tanana River drainage, the bag and possession limit for chinook salmon is 1.

Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed unanimously, no changes.

Proposal Number: 279. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS. This proposal establishes a uniform bag and possession limit for salmon in all lakes within the Tanana regulatory area.

In all lakes within the Tanana regulatory area, the bag and possession limit for salmon is 10.

Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed unanimously, no changes.

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Proposal Number: 280. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS. This proposal establishes a uniform bag and possession limit for salmon, other than king salmon, in all flowing waters of the Tanana River drainage.

In all flowing waters of the Tanana drainage, the bag and possession limit for salmon, other than king salmon, is 3.

Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed unanimously, no changes.

Proposal Number: 281. 5 AAC 70.025 WATERS CLOSED TO SPORT FISHING. This proposal closes specific marine waters of Norton Sound and the freshwater drainages that flow into Norton Sound to sport fishing for chum salmon.

In Norton Sound, the waters of Safety Sound and Bonanza Channel inside the barrier spit and Safety Bridge, the marine waters from Cape Nome Jetty west to include the Sinuk River, and the freshwater drainages that flow into Norton Sound are closed to the taking of chum salmon.

Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed but amended as follows: Proposal 281 A 5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. (1) All freshwater drainages that flow into and the marine waters of Norton Sound between the west bank of the Sinuk River and Topkok Head are closed to the taking of chum salmon.

Proposal Number: 283. 5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. This proposal creates a catch and release sport fishery for Arctic grayling on a section of the Chena River drainage.

In the Chena River drainage, upstream from the Chena River dam, grayling may not be possessed or retained.

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Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed but amended as follows:

Proposal 283 A

5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. (i) in the Chena River and its tributaries, grayling may not be possessed or retained.

Proposal Number: 284. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS; 5 AAC 70.035 METHODS AND MEANS; and 5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. This proposal establishes a catch and release fishery for Arctic grayling in the Nome Creek drainage during the spawning season; allows only unbaited, single hook, artificial lures; and establishes a bag and possession limit of 5 fish per day with a minimum size limit of 12 inches (305 mm).

5 AAC 70.050. In the Nome Creek drainage, the bag and possession limit for grayling is 5. The minimum legal size is 12 inches (305 mm).

5 AAC 70.035. Only unbaited, artificial lures may be used in the Nome Creek drainage.

5 AAC 70.050. In the Nome Creek drainage, Arctic grayling may not be possessed or retained from April 1 to the first Saturday in June.

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Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed but amended as follows:

Proposal 284 B

5 AAC 70.020. BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS. In the Nome Creek drainage, the bag and possession limit for grayling is 5. The minimum legal size is 12 inches (305 mm)

5 AAC 70.050. WATERS CLOSED TO SPORT FISHING. In the Nome Creek drainage, Arctic grayling may not be possessed or retained from April 1 to the first Saturday in June.

5 AAC 70.035. METHODS AND MEANS. Only unbaited single hooks can be used in the Nome Creek drainage from April 1 to the first Saturday in June.

Proposal Number: 285. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS; 5 AAC 70.035 METHODS AND MEANS; and 5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. This proposal establishes a catch and release fishery for Arctic grayling in the Chatanika River drainage during the spawning season; allows only unbaited single hook artificial lures in a section of the Chatanika River; and establishes a minimum size limit of 12 inches (305 mm).

5 AAC 70.020. In the Chatanika River drainage, upstream from department markers placed approximately one mile (1.6 km) upstream from the Elliott Highway Bridge, the minimum legal size for grayling is 12 inches Z(305 mm).

5 AAC 70.035. Only unbaited, artificial lures may be used in the Chatanika River drainage.

5 AAC 70.050. In the Chatanika River drainage, Arctic grayling may not be possessed or retained from April 1 to the first Saturday in June.

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Proposed by: Alaska Department of Fish and Game.

BOF Action: Passed but amended as follows:

Proposal 285 B

5 AAC 70.020. BAG LIMITS POSSESSION LIMITS, AND SIZE LIMITS. In the Chatanika River drainage, upstream from department markers paced approximately one mile (1.6 m) upstream from the Elliott Highway Bridge, the minimum legal size for grayling is 12 inches (305 mm).

5 AAC 70.050. WATERS CLOSED TO SPORT FISHING. In the Chatanika River drainage, Arctic grayling may not be possessed or retained from April 1 to the first Saturday in June.

5 AAC 70.035. METHODS AND MEANS. Only unbaited artificial flies or lures using single hooks can be used in the Chatanika River drainage from April 1 to the first Saturday in June.

Proposal Number: 286. 5 AAC 70.101 FISHING SEASONS. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS. Change the season and bag limit to the following: Grayling: entire year; 2 per day, 2 in possession; and no size limit.

Proposal is intended to apply only to the Mineral Lake Outlet near Tok. It would: (1) rescind the spring closure; (2) rescind the 12 inch size limit; and (3) enact a 2 fish bag and possession limit for the entire year.

Proposed by: John Barker

BOF Action: Passed unanimously.

Proposal Number: 287. 5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. This proposal closes seasons for fishing for whitefish in the Chatanika River drainage.

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In the Chatanika River, downstream from a department marker located approximately one mile (1.6 km) upstream from the Elliott Highway Bridge, whitefish may not be taken from October 1 through April 30.

Proposed by: Alaska Department of Fish and Game

BOF Action: Passed unanimously.

Proposal Number: 288. 5 AAC 70.020 BAG LIMITS, POSSESSION LIMITS AND SIZE LIMITS. 5 AAC 70.035. METHODS AND MEANS. This proposal provides additional protection to northern pike populations in the Tanana River drainage prior to and during their spawning period.

Proposed by: Alaska Department of Fish and Game

BOF Action: Passed but amended as follows:

5 AAC 70.050 WATERS CLOSED TO SPORT FISHING. In the Tanana River drainage, northern pike may not be possessed or retained from April 1 through May 31.

Proposal Number: 289. 5 AAC 0.35 METHODS AND MEANS. Sport fishermen will be required to keep the fish they catch. Once a person has caught their limit of any species of fish, they must stop fishing. Bag and possession limits should be decreased to protect the fish populations while at the same time allowing people a reasonable number of fish to take home. Note: proposal carried over from the 1989-90 meeting cycle.

Proposed by: Central Bering Sea Advisory Committee and Western Region Council.

BOF Action: No action taken. (no testimony presented by staff or public on potential impacts to subsistence practices or needs)



## APPENDIX C

## Appendix C. -AYK Region sport fishing regulations summary for 1992.

### ARCTIC-YUKON-KUSKOKWIM AREA

*This is a summary of the official regulations codified in 5AAC 70.001-050 which is available for inspection at libraries, department offices and Department of Public Safety offices throughout the state.*

#### Instructions:

1. Find the water (alphabetically listed) that you intend to fish. If the water, or any portion of it, is not listed, the regulations in the shaded entry apply.

2. Use the **Code Key** (at the end of this section) to determine open season, catch, and length limits.

Read **Special Regulations**.

3. An asterisk (\*) denotes **Special Regulations** apply.

WATER	SEASON & CATCH LIMIT						SPECIAL REGULATIONS
	Season	July-October Arctic Char Lake Trout Rainbow Trout Grayling	Season	Season Pike Walleye	Season	Other Fish Species	
<b>ALL WATERS not listed below</b>	<b>A,C</b>	<b>F,G,J,I</b>	<b>L</b>	<b>N,P</b>	<b>Q</b>	<b>R,S, T,U</b>	
ANIAK RIVER drainage	B,E	*F,G,J,I	L	N,P		U	1. *In all flowing waters of the Aniak River drainage upstream of its confluence with Doestock Creek only unbaited, single-hook artificial lures may be used. Rainbow trout may not be possessed or retained; all rainbow trout caught must be released immediately.
GOODNEWS RIVER drainage	A,E	F,G,J,I	L	N,P		U	1. In all flowing waters of the Goodnews River drainage upstream of the Togiak National Wildlife Refuge wilderness area boundary only unbaited, singlehook artificial lures may be used. 2. No person may sport fish from a boat or the river bank within 300 feet of a legally operating subsistence set gillnet downstream of the Togiak National Wildlife Refuge Wilderness area boundary.
KANEKTOK RIVER drainage	A,E	F,G,J,I	L	N,P		U	1. In all flowing waters of the Kanikook River drainage upstream of the Togiak National Wildlife Refuge wilderness area boundary only unbaited, single-hook lures may be used. 2. No person may sport fish from a boat or the river bank within 300 feet of a legally operating subsistence set gillnet downstream of the Togiak National Wildlife Refuge Wilderness area boundary.
KIVALINA RIVER drainage	A,C	G,K		N,P		U	
KOBUK RIVER drainage upstream of the mouth of Mauneluk River remainder of the Kobuk River	A,C A,C	G,J,I G,J,I	M L	N,P N,P		U U	
KUSKOEWIM BAY drainages: All waters that drain into Kuskokwim Bay (excluding the Kuskokwim River) from Cape Avinof to Cape Newenham	A,E	F,G,J,I	L	N,P		U	
KUSKOKWIM RIVER drainage	B,E	F,G,J,I	L	N,P		U	
NOATAK RIVER drainage	A,C	G,K,I	L	N,P		U	
NOME CREEK drainage	A,C	*J		N,P		U	1. *The bag and possession limit for grayling is five fish. Grayling less than 12 inches may not be possessed or retained; all grayling less than 12 inches must be released immediately. 2. *From April 1 to the first Saturday in June grayling may not be possessed or retained; all grayling must be released immediately. 3. Only unbaited, single-hook, artificial lures may be used from April 1 to the first Saturday in June.

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## Arctic-Yukon-Kuskokwim Area

WATER	SEASON & CATCH LIMIT						SPECIAL REGULATIONS
	Salmon	Dolly Varden Arctic Char Lake Trout Rainbow Grayling	Sheefish	Northern Pike Burbot	Halibut	Other Fish Shellfish	
<b>NORTH SLOPE</b> waters: (All waters draining into the Arctic Ocean and all waters draining into the Chukchi Sea north of Point Hope)	A,C	G,K,I	L	N,P		U	
<b>NORTON SOUND</b> waters: (All manne waters and fresh water drainages between Canal Point Light and Cape Prince of Wales)	A,C*	F,G,J	L	N,P	Q	R,S,T,U	*The freshwater drainages and the marine waters of Norton Sound between the west bank of the Sinuk River and Topkok Head, and from a department marker placed 3/4 mile east of Elm village to the mouth of the Kwik River are closed to fishing for chum salmon. See Seward Peninsula and Unalakleet River.
<b>SEWARD PENINSULA</b> waters: (All waters draining into Norton Sound from Cape Darby to Cape Prince of Wales on the Seward Peninsula)	B* D*	H,J		N,P		U	* Salmon Lake, its tributaries, and the outlet stream 300 feet downstream from the lake outlet are closed to salmon fishing.
<b>TRANS-ALASKA PIPELINE:</b> (A corridor 5 miles wide north of the Yukon River on each side of the alignment)	Closed	G,J,I	L	N,P		U	
<b>UNALAKLEET RIVER</b> drainage	B,C	H,J		N,P		U	
<b>WULIK RIVER</b> drainage	A,C	G,K		N,P		U	
<b>YUKON RIVER</b> drainage: from the mouth of the Tanana River upstream to, and including, the Hodzana River remainder of the drainage	A,C A,C	G,J,I G,J,I	L L	O,P N,P		U U	

**CODE KEY: ARCTIC-YUKON-KUSKOKWIM AREA** Use these codes to determine open season, catch and length limits.

CODE		OPEN SEASON	BAG, POSSESSION, AND SIZE LIMITS
A	KING SALMON	Entire Year	3 per day, 3 in possession, only 2 can exceed 28 inches
B	KING SALMON	Entire Year	1 per day, 1 in possession, no size limit
C	OTHER SALMON	Entire Year	10 per day, 10 in possession, no size limit
D	OTHER SALMON	Entire Year	10 per day, 10 in possession, only 3 which may be chum salmon and coho salmon, in combination
E	OTHER SALMON	Entire Year	5 per day, 5 in possession, no size limit
F	RAINBOW TROUT	Entire Year	2 per day, 2 in possession, only 1 over 20 inches
G	GRAYLING	Entire Year	10 per day, 10 in possession, no size limit
H	GRAYLING	Entire Year	5 per day, 5 in possession, only 1 over 15 inches
I	LAKE TROUT	Entire Year	4 per day, 4 in possession, no size limit
J	ARCTIC CHAR/ DOLLY VARDEN	Entire Year	10 per day, 10 in possession, no size limit
K	ARCTIC CHAR/ DOLLY VARDEN	Entire Year	10 per day, 10 in possession, only 2 over 20 inches
L	SHEEFISH	Entire Year	10 per day, 10 in possession, no size limit
M	SHEEFISH	Entire Year	2 per day, 2 in possession, no size limit
N	NORTHERN PIKE	Entire Year	10 per day, 10 in possession, no size limit
O	NORTHERN PIKE	Entire Year	5 per day, 5 in possession, only 1 over 30 inches
P	BURBOT	Entire Year	15 per day, 15 in possession, no size limit
Q	HALIBUT	Feb. 1 - Dec. 31	2 per day, 4 in possession, no size limit
R	KING CRAB (Red & blue in combination)	in waters south of 60° north latitude: June 1 - Jan. 31 In waters north of 60° north latitude: Entire Year	6 per day, 6 in possession, males only: Red King Crab 4 3/4 inches or more; Blue King Crab 5 1/2 inches or more 6 per day, 6 in possession, males only: Red King Crab 4 3/4 inches or more; Blue King Crab 5 1/2 inches or more
S	DUNGENESS CRAB	Entire Year	6 1/2 inches or more: 12 per day, 12 in possession, males only
T	TANNER CRAB (C. Bairdi and C. Opilio combination)	Entire Year	12 per day, 12 in possession, males only: C. Bairdi - 5 1/2 inches or more C. Opilio - 3 1/8 inches or more
U	OTHER FISH/ SHELLFISH	Entire Year	No bag, possession or size limit

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## Arctic-Yukon-Kuskokwim Area

### OTHER ARCTIC-YUKON-KUSKOKWIM AREA REGULATIONS

#### METHODS AND MEANS.

1. In all lakes, multiple hooks with gap between point and shank greater than one-half inch may be used for taking fish other than salmon.
2. Suckers and burbot may be taken by spear or bow and arrow from January 1 through December 31.
3. Northern pike and whitefish (excluding sheefish) may be taken by spear or bow and arrow from September 1 through April 30 and may be speared by persons completely submerged from January 1 through December 31.

#### SHELLFISH METHODS AND MEANS.

1. Shellfish may be taken only as follows:
  - a. shrimp may be taken with pots and ring nets;
  - b. crab may be taken with pots, ring nets, diving gear, dipnets, hooked or hookless lines either operated by hand or attached to a pole or rod, or by hand;
  - c. clams may be taken with rakes, shovels, manually operated clam guns, or by hand.
2. No more than five pots per person, regardless of type, and a maximum of ten pots per vessel, regardless of type, may be used to take shellfish at any time.

3. Each sport fisherman shall plainly and legibly inscribe his or her first initial, last name, and home address on a keg or buoy attached to each pot. A keg or buoy attached to a pot must also be inscribed with the name or the Coast Guard number of the vessel used to operate the pot.

4. Escape mechanisms as described in the Personal Use Shellfish Regulations (page 91) must be provided for each pot.

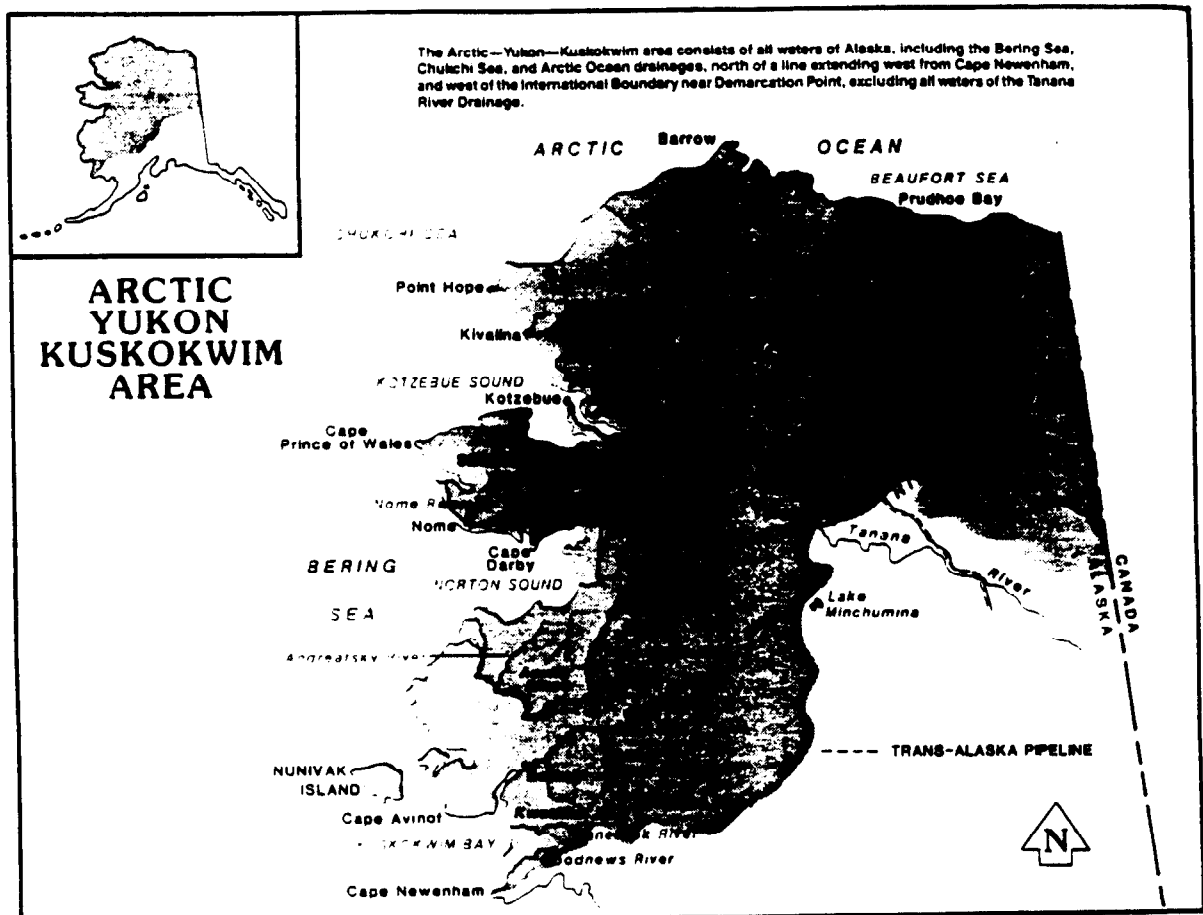
5. The bag, possession, and pot limits for shellfish in this chapter are not in addition to those allowed under subsistence fishing regulations, nor to those allowed under personal use fishing regulations.

6. No person may mutilate or otherwise disfigure any crab in any manner which would prevent the determination of the minimum size restrictions until the crab has been processed for human consumption. No person may take or possess shellfish smaller than the minimum legal size limits.

7. The operator of a commercially licensed and registered shrimp fishing vessel used in the sport fish taking of shrimp during a closed commercial shrimp season or within a closed commercial shrimp district, section, or subsection may not possess more than 500 pounds on board the vessel.

#### HARVEST RECORDING FORM.

A person must obtain a harvest recording form from the department prior to fishing for king crab in the Norton Sound section of the Northern District.P





## APPENDIX D

# Appendix D. –Sport fishing effort\* by location in the Arctic-Yukon-Kuskokwim Region, 1980-1992.

Fishery	Effort (Angler-Days) by Year													Mean	Mean
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	(All)	(85-92)
<b>Tanana Area:</b>															
Chena River <sup>b</sup>	30,654	26,753	40,535	40,902	40,223	27,133	35,030	25,065	31,851	37,562	29,361	21,138	12,654	30,651	27,474
Piledriver Slough	NR <sup>c</sup>	NR	NR	4,148	4,651	NR	NR	13,267	24,375	22,746	27,705	17,703	13,607	16,025	19,901
Nenana River Drain.	NR	NR	NR	NR	NR	NR	NR	1,575	1,912	1,719	724	1,550	1,863	1,557	1,557
Chatanika River	5,576	4,691	9,417	10,757	8,605	10,231	7,783	11,065	11,642	12,210	11,801	8,085	6,775	9,126	9,949
Salcha River	8,858	8,090	14,126	11,802	8,449	13,109	13,792	10,576	7,494	9,704	9,783	11,242	4,833	10,143	10,067
Delta Clearwater R.	4,240	4,673	4,231	5,867	5,139	8,722	10,137	5,397	5,184	5,368	4,853	5,594	3,862	5,635	6,140
Goodpaster River	NR	NR	NR	1,989	766	2,844	933	3,061	1,037	1,930	2,083	786	1,430	1,686	1,763
Tanana River	NR	NR	NR	NR	2,195	988	9,449	5,940	4,965	4,850	4,593	5,115	6,102	4,910	5,250
Brushkana Creek	NR	NR	NR	NR	NR	NR	550	674	1,114	887	725	666	1,120	819	819
Shaw Creek	NR	NR	NR	NR	2,195	1,248	2,003	797	NR	488	1,462	773	491	1,182	1,037
Richardson Clear.	NR	916	1,365	1,349	NR	NR	NR	NR	NR	1,364	518	1,199	1,355	1,152	1,109
Delta R. (below Tangle Lakes)	NR	NR	NR	NR	NR	624	NR	NR	800	388	958	679	790	707	706
Other Stream	NR	NR	NR	19,054	10,904	12,675	7,378	7,556	10,578	6,168	7,653	4,628	4,164	9,076	7,600
Birch Lake	17,036	14,233	16,677	15,882	13,170	14,444	9,969	15,375	15,607	14,284	15,541	13,893	10,072	14,321	13,648
Quartz Lake	13,994	19,599	18,254	14,162	15,922	16,456	18,486	20,410	19,391	18,299	19,746	15,478	13,486	17,206	17,719
Fielding Lake	NR	1,369	2,764	1,737	871	1,023	1,682	1,032	1,728	1,664	1,255	1,572	1,803	1,542	1,470
Minto Lakes	2,727	2,045	1,791	1,281	1,829	2,011	3,318	1,539	1,564	699	932	1,532	2,401	1,820	1,750
Tangle Lakes	8,168	5,530	9,502	5,513	3,954	5,601	5,122	2,530	2,656	3,991	5,228	6,407	4,791	5,307	4,541
Chena Lakes	NR	NR	NR	NR	11,044	11,288	8,853	9,472	9,404	16,180	12,875	9,444	6,007	10,507	10,440
Harding Lake	NR	NR	NR	NR	1,707	NR	2,064	5,125	3,256	4,935	3,895	5,155	5,068	3,901	4,214
Dune Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	2,296	815	799	854	1,191	1,191
East Twin Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	765	1,035	679	950	857	857
George Lake	1,057	1,351	989	860	1,254	1,127	1,957	1,467	964	610	1,540	1,931	1,067	1,244	1,332
Volkmar Lake	NR	458	546	270	NR	NR	NR	NR	NR	NR	NR	1,052	608	587	587
Koole Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	433	686	NR	NR	560	560
Healy Lake	NR	NR	NR	NR	NR	NR	NR	NR	NR	954	NR	NR	NR	954	954
Steese Ponds	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1,785	960	1,372	1,372
Chena Hot Springs Road Ponds	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2,224	1,206	1,715	1,715
Meadow Road Lakes	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	2,975	1,751	2,363	2,363
Coal Mine Road	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1,230	565	898	898
Other Lakes	NR	NR	NR	9,813	12,874	6,898	6,431	14,148	19,996	15,924	19,120	10,349	9,669	9,632	12,817
Other	39,184	25,391	30,333	NR	NR	NR	NR	NR	NR	NR	NR	NR	533	5,965	533
Total	131,494	115,099	150,530	145,386	145,752	136,422	144,937	156,061	175,518	186,418	184,887	155,663	120,837	174,611	172,333

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# Appendix D—Page 2 of 6.

Fishery	Effort (Angler -Days) by Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>AYK Area, Yukon River Sub-area</b>													
Koyukuk River	1,299	852	1,855	6,120	2,194	2,184	6,644	3,151	2,799	3,476	4,790	2,139	3,359
Porcupine River	1,360	1,116	930	387	279	624	46	74	730	213	558	1,089	854
Andreafsky River	616	9	100	118	17	NR	122	72	91	184	415	348	331
Innoko River	26	184	NR <sup>b</sup>	51	35	NR	31	NR	164	219	563	520	85
Anvik River	13	NR	NR	51	NR	NR	NR	NR	728	795	95	1,609	854
Nulato River	13	NR	14	NR	87	NR	NR	347	NR	553	237	55	107
Melozitna River	171	37	215	17	87	NR	NR	NR	73	415	47	62	149
Nowitna River	65	211	517	388	122	312	269	453	946	691	686	1,275	673
Dall River	250	498	473	405	1,428	139	596	545	217	438	273	359	224
Chandalar River	228	372	184	120	NR	17	46	149	179	57	249	111	227
Charley River	NR	37	43	354	NR	139	NR	135	31	69	152	124	245
Fortymile River	39	156	373	810	139	139	31	135	273	57	309	285	297
Other above Tanana	459	267	545	220	559	451	232	238	493	350	769	584	1,375
Other below Tanana	526	357	473	455	558	642	239	722	710	537	382	567	707
Yukon Dr. Lakes	513	676	366	1,179	854	1,214	942	550	420	1,318	3,154	508	758
Other Yukon River	1,261	1,905	4,945	564	121	2,411	259	446	443	1,100	2,860	1,021	1,876
Total	6,859	6,677	11,033	11,239	6,480	8,272	9,457	7,017	8,297	10,472	15,539	10,656	10,432

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Appendix D—Page 3 of 6.

Fishery	Effort (Angler -Days) by Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>AYK Area, Kuskokwim River Sub-area</b>													
<b>Kuskokwim Bay/Lower Kuskokwim River</b>													
Kanektok River	1,193	265	1,507	1,517	6,881	4,873	8,825	9,689	12,697	4,176	4,525	3,078	4,972
Goodnews River	592	NR	503	742	1,010	4,214	229	2,372	1,219	1,315	4,528	1,468	1,451
Kwethluk River	158	NR	115	523	383	173	183	797	NR	1,882	1,048	306	640
Aniak River	NR	NR	NR	287	383	87	1,116	507	2,437	4,035	1,964	3,129	2,529
Kisaralik River	26	27	187	1,383	NR	NR	NR	362	NR	554	106	281	619
Kasigluk River	NR	NR	NR	303	NR	NR	NR	NR	NR	115	66	37	203
Other Streams	1,065	560	2,281	574	836	798	153	1,014	4,111	908	371	1,289	690
Lakes	407	479	675	NR	227	NR	428	91	NR	469	199	486	507
<b>Upper Kuskokwim River</b>													
Holitna River	NR	28	387	556	279	312	98	833	346	877	398	1,022	533
Hoholitna River	NR	NR	574	NR	NR	NR	NR	54	NR	19	146	NR	NR
Takotna River	131	92	43	540	70	104	46	743	473	606	119	192	25
Salmon River	NR	NR	NR	NR	488	260	NR	NR	62	335	1,274	115	64
Other Streams	4,027	6,810	5,815	5,144	2,648	260	179	1,014	932	566	409	1,078	1,388
Lakes	NR	65	129	860	591	173	31	NR	491	187	292	300	598
Total	7,599	8,326	12,216	12,429	13,796	11,254	11,288	17,476	22,768	16,044	15,495	12,781	14,219

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**Appendix D—Page 4 of 6.**

Fishery	Effort (Angler -Days) by Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>North Slope Subarea:</b>													
SALTWATER:													
Boat					2,090			34	62	82	34	231	75
Shoreline					3,658	891	955	1,090	743	308	285	523	312
SALTWATER TOTAL				1,282	5,748	891	955	1,124	805	390	319	754	387
FRESHWATER:													
Sagavanirktok River											493	2,282	1,366
Other Dalton Hwy Streams					993	1,856	793	686	992	982	399	602	800
Other Streams				3,949 <sup>d</sup>	540	1,002	1,634	1,866	807	1,720	1,474	2,383	1,650
Dalton Hwy Lakes					662	185	170	668	158	390	852	343	310
Other Lakes				388 <sup>d</sup>	401	556	1,227	912	36	227	636	927	427
FRESHWATER TOTAL:				4,337	2,596	3,599	3,824	4,132	1,993	3,445		6,537	4,553
GRAND Total	2,142 <sup>e</sup>	2,601 <sup>e</sup>	4,879 <sup>e</sup>	5,619	8,344	4,490	4,779	5,256	2,541	3,764	4,118	7,291	4,940

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Appendix D—Page 5 of 6.

Fishery	Effort (Angler -Days) by Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>Seward Peninsula-Norton Sound Subarea:</b>													
SALTWATER:													
Boat	NR	NR	NR	2,178	1,934	278	283	688	272	481	1,372	325	2,009
Shoreline		NR	NR	2,088	2,944	1,500	567	344	550	1,768	1,644	1,179	1,324
SALTWATER TOTAL			NR	4,266	4,878	1,778	850	1,032	822	2,249	2,966	1,504	3,333
FRESHWATER:													
Nome River			NR	3,908	5,714	5,681	6,023		5,639	6,569	6,609	4,609	6,306
Pilgrim River			NR	597					4,729	1,645	1,627	3,085	1,184
Unalakleet River			NR	4,057	2,073	5,528	6,457			1,701	3,957	5,518	2,209
Fish-Niukluk River System				1,939					2,183	1,992	2,059	2,470	2,635
Sinuk River												885	1,504
Snake River												2,384	2,379
Solomon River												1,057	950
Kuzitrin River												750	
Other Streams				2,058	4,771	6,279	2,889	18,099	6,812	3,487	4,468	1,342	2,172
Lakes				119		653	1,888	2,282	93	49	113	18	12
FRESHWATER TOTAL:				12,678	12,558	18,141	17,257	20,381	19,456	15,433	18,833	22,118	19,351
GRAND Total	7,968	10,879	13,198	16,944	17,436	19,919	18,107	21,413	20,278	17,692	21,799	23,622	22,684

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## Appendix D—Page 6 of 6.

Fishery	Effort (Angler -Days) by Year												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
<b>Kotzebue Area:</b>													
SALTWATER:													
Boat					827	120	31	194		59		186	310
Shoreline					1,254	192	538	739	31	420	100	1,248	78
SALTWATER TOTAL					2,081	312	569	933	31	479	100	1,434	388
FRESHWATER:													
Kobuk River		2,389	2,405	2,148			2,508	4,864		1,465	1,306	2,206	1,526
Noatak River		1,505	1,518	1,372		2,991	1,116	3,313		2,469	1,306	3,708	2,273
Wulik River			580	805									
Other Streams		1,325	2,337	2,206	5,240	3,159	1,890	1,010	4,702	219	719	1,889	1,331
Lakes				1,432	470	239	230	101	546	300	351	306	627
FRESHWATER TOTAL		5,219	6,840	7,963	5,710	6,389	5,744	9,288	5,248	4,453	3,682	8,109	5,757
GRAND Total	3,841	5,219	6,840	7,963	7,791	6,701	6,313	10,221	6,279	4,932	3,782	9,543	6,145

<sup>a</sup> From Mills (1978-1992).

<sup>b</sup> The Chena River and tributaries including Badger Slough.

<sup>c</sup> No effort or harvest reported.

<sup>d</sup> Estimates include Dalton Highway streams and lakes but specific locations are not recorded.

<sup>e</sup> Estimates not specific to location.





## APPENDIX E

# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order No. 3-G-01-92

Issued at Fairbanks, Alaska  
May 08, 1992

Effective Date: 12:01 a.m. ADT  
Friday, May 15, 1992

Expiration Date: Valid until  
superseded by subsequent  
regulatory action.

EXPLANATION:


This emergency order closes the following waters to sport fishing for Arctic grayling from May 15, 1992 until further notice: The Nome River and the Solomon River.

REGULATION:

SAAC 70.010. FISHING SEASONS. (f) effective May 15, 1992, the Nome and Solomon rivers are closed to sport fishing for Arctic grayling. Arctic grayling may not be possessed or retained, and must be released unharmed.

Carl L. Rosier  
Commissioner

By delegation to:

  
Alfred L. DeCicco  
Area Management Biologist

JUSTIFICATION:

Based on assessment work conducted by the Sport Fish Division in the Nome area, the Arctic grayling stocks in both the Nome and Solomon rivers were found to be severely depressed. The total abundance of Arctic grayling in the Nome River was estimated to be only 430 fish. Only three Arctic grayling were captured in the Solomon River during 1991 and only one in 1988. Because grayling stocks are severely depressed in these waters, additional harvest is not prudent. This emergency order restricts the sport fishery in the Nome and Solomon rivers for conservation reasons so that Arctic grayling stocks may recover.

DISTRIBUTION:

The distribution list of this emergency order is available from the Department of Fish and Game office in Fairbanks.

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# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order No. 3-C-02-92

Issued at Fairbanks, Alaska  
May 08, 1992

Effective Date: 12:01 a.m. ADT  
Friday, May 15, 1992

Expiration Date: Valid until  
superseded by subsequent  
regulatory action.

EXPLANATION:


This emergency order reduces the daily bag and possession limit for Dolly Varden in the Nome River from 10 per day to 2 per day from May 15, 1992, until further notice.

REGULATION:

5AAC 70.020. DAILY BAG AND POSSESSION LIMITS. (12) effective May 15, 1992, in the Nome River, the daily bag and possession limit for Dolly Varden/Arctic char is 2 fish.

Carl L. Rosier  
Commissioner

By delegation to:

  
Alfred L. DeCicco  
Area Management Biologist

JUSTIFICATION:

Based on assessment work conducted by the Sport Fish Division in the fall of 1991, about 3,000 Dolly Varden were estimated to be in the Nome River. Harvests of Dolly Varden from the Nome River have averaged about 1,800 fish since 1983 with the most recent harvest estimate (1990) being about 1,200 fish. Recent harvest levels are not sustainable. In order to reduce the harvest of Dolly Varden from the Nome River yet still provide for a reduced level of consumptive harvest and for full recreational opportunity, this emergency order reduces the daily bag and possession limit of Dolly Varden/Arctic char to two fish.

DISTRIBUTION:

The distribution list of this emergency order is available from the Department of Fish and Game office in Fairbanks.

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# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order No. 3-G-03-92

Issued at Fairbanks, Alaska  
May 08, 1992

Effective Date: 12:01 a.m. ADT  
Friday, May 15, 1992

Expiration Date: Valid until  
superseded by subsequent  
regulatory action.

### EXPLANATION:

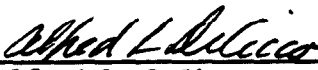
This emergency order reduces the daily bag and possession limit for Arctic grayling in the Pilgrim River from 5 per day with only 1 over 15 inches to 2 per day with only 1 over 15 inches from May 15, 1992 until further notice.

### REGULATION:

SAAC 70.020. DAILY BAG AND POSSESSION LIMITS. (13) effective May 15, 1992, in the Pilgrim River, the daily bag and possession limit for Arctic grayling is 2 fish of which only 1 may be over 15 inches in total length.

Carl L. Rosier  
Commissioner

By delegation to:

  
Alfred L. DeCicco  
Area Management Biologist

### JUSTIFICATION:

Findings from assessment work conducted by the Sport Fish Division in the Pilgrim River during 1990 and 1991 indicated that abundance of Arctic grayling in the section of the river that is most heavily fished dropped from approximately 1,750 to 1,400 fish. The 1990 harvest of Arctic grayling from the Pilgrim River was estimated at 415 fish, and has averaged 350 fish during the past three years. Arctic grayling in the Nome area are long lived and grow rapidly through sexual maturity (age 6 or 7) after which growth slows. Populations with these characteristics can only sustain limited levels of exploitation. By reducing the daily bag and possession limit, the harvest of Arctic grayling from the Pilgrim River will be reduced while still allowing some level of consumptive harvest and continued recreational opportunity. The department will continue to monitor the status of the Arctic grayling population in the Pilgrim River to assess changes in population structure and impacts of this regulatory change.

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**DISTRIBUTION:**

The distribution list of this emergency order is available from the Department of Fish and Game office in Fairbanks.

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# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order No. 3-S-04-92

Issued at Fairbanks, Alaska  
May 08, 1992

Effective Date: 12:01 a.m. ADT  
Friday, June 1, 1992

Expiration Date: July 31, 1992  
unless superseded by subsequent  
emergency order.

### EXPLANATION:

This emergency order closes the following waters to sport fishing for chum salmon from June 1, 1992 until July 31, 1992: marine waters and freshwater drainages from an Alaska Department of Fish and Game marker on Elim Point, three fourths of a mile east of Elim village to the Kwik River (Subdistrict 3 of the Port Clarence Commercial Fishing Area, including the Tubutulik and Kwiniuk river drainages).


### REGULATION:

SAAC 70.010. FISHING SEASONS. (f) is amended by adding:

in marine waters and freshwater drainages from an Alaska Department of Fish and Game marker on Elim Point, three fourths of a mile east of Elim village, to the terminus of the Kwik River (Subdistrict 3 of the Port Clarence Commercial Fishing Area, including the Tubutulik and Kwiniuk river drainages), chum salmon caught on sport fishing gear between June 1, 1992 and July 31, 1992 may not be retained or possessed.

Carl L. Rosier  
Commissioner

By delegation to:

  
Alfred L. DeCicco  
Area Management Biologist

### JUSTIFICATION:

Chum salmon escapement needs have not been met in the Kwiniuk River and neighboring streams in recent years. Uncertainty about chum salmon run strength to this area in 1992 requires a conservative approach to management of the fishery. Accordingly, a closure of the recreational fishery for chum salmon is required. The Commercial Fisheries Division will assess run

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strength by various means during the course of the season. If escapement needs have been met or are projected to be met, this restriction will be lifted. However, if escapement and/or subsistence requirements are not satisfied, this closure will remain in effect.

DISTRIBUTION:

The distribution list of this emergency order is available from the Department of Fish and Game office in Fairbanks.

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# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order No. 3-S-05-92

Issued at Nome, Alaska  
July 13, 1992

Effective Date: 17:59 p.m. ADT  
Monday, July 13, 1992

Expiration Date: August 31, 1992  
unless superseded by subsequent  
emergency order.

### EXPLANATION:

This emergency order changes the daily bag and possession limit for pink salmon in marine and fresh waters of Norton Sound. Effective 6 p.m. on July 13, 1992 until August 31, 1992, the sport fish daily bag and possession limit is 20 pink salmon per day.

### REGULATION:

SAAC 70.020. BAG LIMITS, POSSESSION LIMITS, AND SIZE LIMITS. (e) is amended by adding:

in marine and freshwaters between Canal Point Light and Cape Prince of Wales (Norton Sound), the daily bag and possession limit is 20 pink salmon.

Carl L. Rosier  
Commissioner

By delegation to:

Alfred L. DeCicco  
Area Management Biologist

### JUSTIFICATION:

The drainages of Norton Sound are experiencing a near record run of pink salmon. More than adequate numbers of pink salmon are already in all surveyed streams and large numbers of fish are still entering rivers from marine waters. Increasing the daily bag limit should not have negative impacts on pink salmon stocks and will allow sport anglers to take fish that are in excess of escapement needs.

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# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order No. 3-S-06-92

Issued at Fairbanks, Alaska  
July 23, 1992

Effective Date: 6:00 p.m.  
Friday July 24, 1992

Expiration Date: August 15, 1992  
unless superseded by subsequent  
emergency order.

### EXPLANATION:

This emergency order closes the Tanana River and its tributaries to sport fishing for salmon from 6:00 p.m., Friday, July 24, 1992, through August 14, 1992.

### REGULATION:

5 AAC 70.050. WATERS CLOSED TO SPORT FISHING, is amended to read:

(q) All flowing waters of the Tanana River drainage are closed to sport fishing for salmon from 6:00 p.m., Friday, July 24, 1992, through August 14, 1992.

Carl L. Rosier  
Commissioner

By delegation to:

*Jerome E. Hallberg*  
Jerome E. Hallberg  
Area Management Biologist

### JUSTIFICATION:

The return of salmon to spawning streams throughout the Tanana River drainage is drastically low. Spawning escapement objectives for the Chena and Salcha Rivers are set at 1,700 and 2,500 chinook salmon, respectively. To date, aerial surveys have accounted for approximately 600 chinook salmon in the Salcha River and about 100 in the Chena River. Only a few chum salmon have been observed in the spawning streams. In addition a creel survey on the lower Salcha River indicates that sport anglers are experiencing extremely poor catches of salmon. Consequently, it becomes necessary to provide as much protection as possible for the passage of all remaining salmon. Should significant numbers of salmon appear on the spawning grounds, the sport fishing closure may be rescinded.

### DISTRIBUTION:

The distribution list of this emergency order is available from the Department of Fish and Game office in Fairbanks.

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# SPORT FISHING

## Emergency Order

ALASKA DEPARTMENT  
OF FISH AND GAME

Under Authority of AS 16.05.060

Emergency Order Number 3-S-07-92

Issued at Fairbanks  
October 16, 1992

Effective Date: 12:01 AM  
Saturday October 17, 1992

Expiration Date: December 31, 1992  
unless superseded by subsequent  
emergency order.

### EXPLANATION:

This emergency order closes the Delta Clearwater River, Clearwater Lake and the Clearwater Lake outlet stream to the retention of coho salmon effective at 12:01 AM Saturday October 17, 1992. This closure will remain in effect until further notice.


### REGULATION:

SAAC 70.020. BAG, POSSESSION, AND SIZE LIMITS, is therefore amended to read:

(a) in the Delta Clearwater River, Clearwater Lake and the Clearwater Lake outlet stream, coho salmon may not be possessed or retained. Coho salmon must be released unharmed effective at 12:01 AM Saturday October 17, 1992.

Carl L. Rosier  
Commissioner

by delegation to:

  
Fred Andersen  
Management Supervisor

### JUSTIFICATION:

The 1992 return of coho salmon to the Delta Clearwater River and Clearwater Lake is far below normal. Escapement counts have averaged over 8,000 fish annually. In most years, by late September or early October newly arrived coho salmon congregate at the mouth of the Delta Clearwater River. Peak abundance normally occurs by mid-October. On October 16, fewer than 1,000 coho salmon were observed in the entire river and only about 200 coho salmon were observed in the Delta Clearwater Lake and outlet system. Based on these observations, catch-and-release-only regulations are warranted. The Department will continue to monitor run strength and change these restrictions as necessary.

### DISTRIBUTION:

The distribution list of this emergency order is available from the Department of Fish and Game office in Fairbanks.

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